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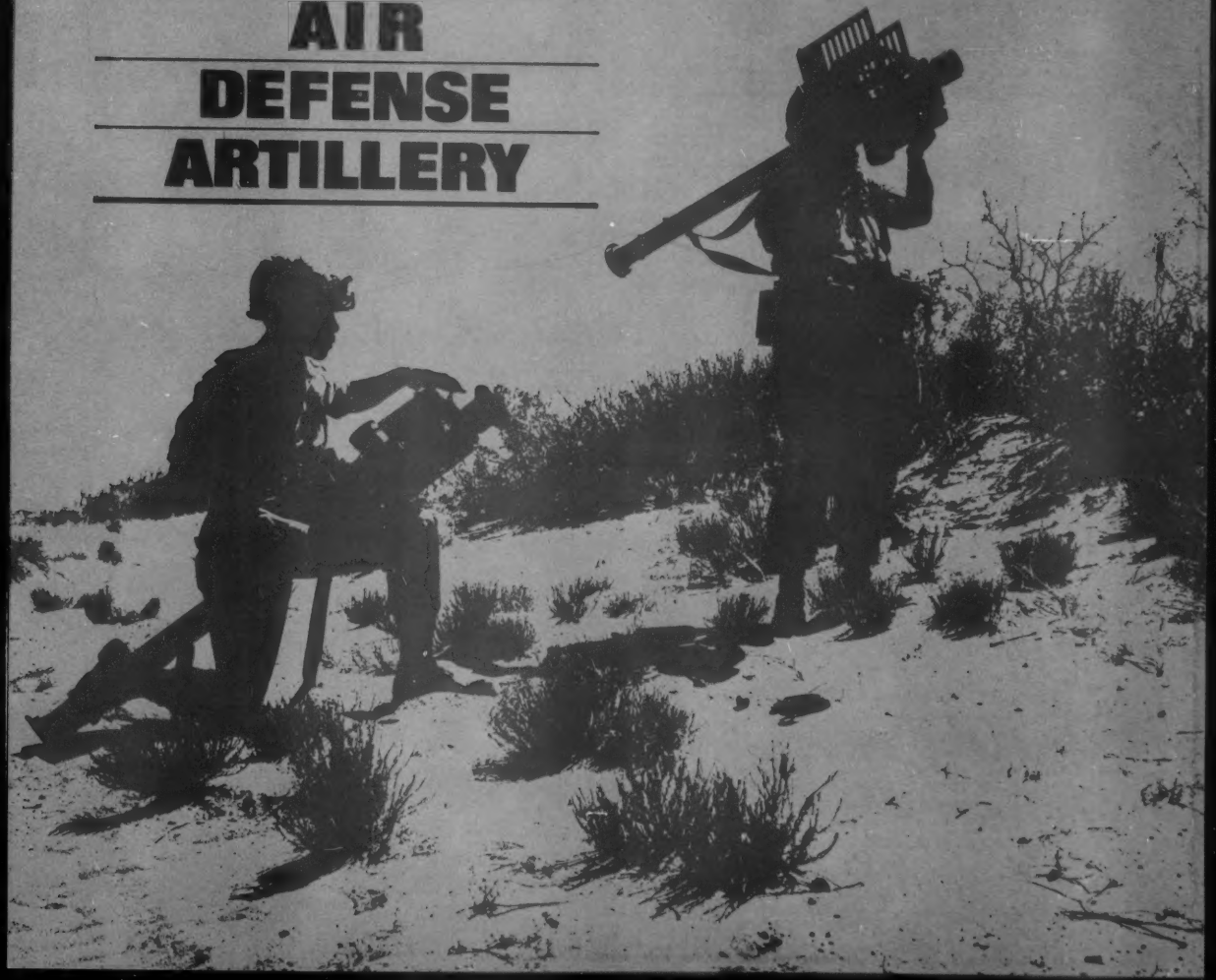
AVIATION DIGEST

JULY 1981

AIR DEFENSE ARTILLERY



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Honorable John A. Marsh Jr.
Secretary of the Army

Richard K. Tierney
Editor

The mission of the ***U.S. Army Aviation Digest (USPS 415-350)*** is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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AIRSPACE, THE ELEMENT in which we Army aviators must work, is often taken for granted. In fact, sometimes we may tend to feel that it all belongs to us. Such is certainly not the case, especially when critical airspace over the battle area is considered. The third dimension of the battlefield must be mutually shared by many types of aircraft and weapons and only through close and continuing coordination can such sharing be effected.

Ground weapons which guard our friendly skies belong to the Air Defense Artillery, and our lead article for July vividly describes their use in both defense and offense in the AirLand Battle. The author, Major General John B. Oblinger Jr., commanding general, Air Defense Center and School, Ft. Bliss, TX, speaks with authority in describing the critical role that these weapons must play.

Looking further at a scenario expected to be typical of tomorrow's conflicts, General Oblinger tells it like it is. Since there will only be a limited number of air defense systems available, it is incumbent upon our commanders to carefully weigh the priorities for the weapons' dispersal and sites to be protected.

The placement and use of the air defense artillery units will be a key element in the AirLand Battle equation, and General Oblinger's article provides an excellent means for Army Aviation personnel to learn more of this contribution.

Just as ADA will be a prime factor on the extended battlefield, Army Aviation must bear equally increasing responsibilities. That is the topic which Captain Josef Reinsprecht and I address in "Army Aviation Forces in the AirLand Battle." This is a look into the future—as to how we must fight, if we are to counter the depth and breadth of the threat on the modern battlefield.

Army Aviation systems and forces allow the commander to see and fight far beyond the friendly front-line of troops on an extended battlefield. Programed and future technological advances in weapons, electro-optical and aircraft systems will greatly enhance this capability and allow even deeper ground target engagements with a corresponding disruption of the enemy's second echelon forces. Army Aviation units must, however, be prepared now to develop, practice, apply and refine the extended battlefield concept using today's assets. The implementation momentum must be maintained so that aviation unit leaders and aircrews produced by the training base are fully prepared for their expanding roles in the AirLand Battle. In order to do so, we must know and understand the concept and principles involved—a must for your reading.

Much of the professionalism of our Army Aviation team is predicated upon our standardization program and a thorough knowledge of our aviation publications. Chief Warrant Officer, CW2, Gary R. Weiland challenges the level of that knowledge with his monthly article "Hangar Talk." Passing these examinations has caused many of us to wrinkle our brow in concentration! How well can you do?

And in this issue, you will also find the introduction to an exciting propositon advanced by Major Brendau P. Blackwell, Office of the Deputy Chief of Staff for Research, Development and Acquisition, Headquarters, DA, in his article, "Black Hawk Around the World" (the second part will be published in August). Major Blackwell is not writing simply about the UH-60 being deployed with Army units worldwide, he is presenting a plan for circumnavigation of the globe by a UH-60, Black Hawk, a feat which has not been accomplished to date by any helicopter.

In addition to achieving an aviation first for the Army, Major Blackwell contends that such a flight would "be a bold test of the ultimate self-deployment capability of the Black Hawk . . . ." What are your thoughts and where can we sign up?

These are just a few of the highlights of the excellent reading ahead for you in this ***Aviation Digest*** issue (do be certain to read about "Captain Curious" in the VFR column!). It is our intent to have your magazine contain informative, entertaining and, above all, lifesaving material that will help us each do our jobs better—be it in maintenance, operations, safety, air traffic control or other Army Aviation related endeavors. For when we do our job better, our entire Army will benefit therefrom.

Major General Carl H. McNair Jr.
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Stinger photo by General Dynamics

AIR DEFENSE ARTILLERY

in the OFFENSE and DEFENSE

Major General John B. Oblinger Jr.
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ARMY Aviation and Air Defense Artillery (ADA) are both vital members of the combined arms team. Successful cooperation between aviation, air defense and the supported maneuver forces depends to a large extent on each member understanding the practices and techniques of the others. I appreciate this opportunity to share with the Army Aviation community information about the way our Air Defense Artillery is organized and tasked to contribute its share to the success of the total force in tomorrow's conflicts.

In those conflicts, it is expected that two distinct air battles will be fought in the division and throughout the corps area. One will focus on the neutralization of communications facilities, depots and staging areas and will primarily be executed by high performance fixed wing aircraft. This air battle will extend from the brigade rear to the corps rear area. The other air battle will be fought from the brigade rear to the forward line where approximately 80 percent of the enemy's aircraft will be attack helicopters.

ADA organization and task organization

The air defense to counter these two distinct threats is a joint Army-Air Force responsibility, with the Army responsibility being accomplished by divisional as well as nondivisional Air Defense Artillery forces. The divisional ADA fire units that are available to deal with this threat consist of the numbers of Chaparral, Vulcan and Redeye weapons shown in figure 1, clearly indicating there are simply not enough air defense weapons available to the maneuver commander. Consequently, the maneuver commander must prioritize his assets for air defense protection, setting up the basis for air defense task organization and mission assignment, and the subsequent positioning of organic weapon systems on the ground by the divisional ADA commander.

Let me use a divisional tactical situation to illustrate how all this takes place. In this particular scenario, the division is about to defend an area with an approximate 60 kilometer (km) front and 80 km depth. The division commander has assessed that the combined arms army he is facing will attempt a breakthrough to destroy or capture communications facilities and depots located in the corps area. The division estimate of the situation is that the most likely ground avenue of approach is through the 1st Brigade sector (figure 2).

Considering that brigade's criticality, recuperability and vulnerability, the division commander established the 1st Brigade as his number one air defense priority, with the 2d Brigade, the division tactical operations center and ammunition storage area following in order. Next, he pro-

FIGURE 1: Divisional ADA Fire Unit Totals (Current)

Division Type	Chaparral/ Vulcan/Redeye*
Armored	24/24/72
Mechanized	24/24/67
Infantry	24/24/68
Airborne	0/48/63
Air Assault	0/48/62

*With Stinger, all Redeye figures change to 72 teams for each division type

vided this initial guidance to his Chaparral/Vulcan (C/V) battalion commander, who then task organized his force to defend the division's priorities. Due to their greater mobility, Vulcan and Redeye units primarily support the brigades, while Chaparral, although integrated into the defense of the division's top priority to provide it more mix, primarily supports the more static assets to the rear.

Once his task organization is complete, the C/V battalion commander will assign his forces their missions. That may be a narrative mission to defend a specific facility or location, an ADA standard tactical mission or a standard tactical mission with certain elements modified or deleted.

Let's sidetrack a moment and take a closer look at the standard tactical missions, as these will normally be assigned to ADA elements supporting maneuver forces:

General Support. Provides air defense for the force as a whole and is not committed to any specific element.

General Support Reinforcing. Provides air defense for the entire force and, secondarily, also augments the coverage of another ADA unit; is not committed to any specific element.

Reinforcing. Augments the coverage of another ADA unit, and both are committed to a specific element of the force.

Direct Support (DS). Provides dedicated air defense for a specific element of the force which does not have its own ADA, so the ADA unit is committed to that specific element.

Each of the four ADA standard tactical mission definitions closely resembles that used by the field artillery. Also similar to the field artillery, these missions

General Oblinger

create a special relationship between the supported and supporting units by specifying certain responsibilities for each commander. One of these responsibilities concerns where supporting ADA fire units are positioned.

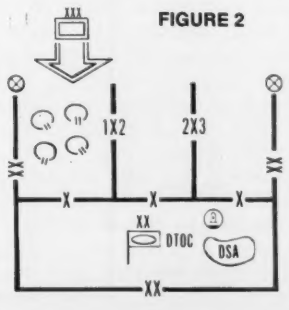
While performing a direct support standard tactical mission, the individual ADA fire unit commanders position their systems on the ground with approval of the local ground commander. Final approval of position selection is the responsibility of the maneuver commander in consideration of air defense needs to overall mission accomplishment.

Returning now to our scenario: The top air defense priority, the 1st Brigade, has a direct support ADA battery of three Vulcan platoons, two Chaparral platoons and one Redeye platoon. The brigade commander determines his air defense priorities, and the battery commander then allocates available fire units to provide adequate protection for them (figure 3). Again, Vulcan is allocated to the defense of maneuver elements and Chaparral is placed in defense of more static assets to the rear.

Establishing priorities and tailoring available forces continue in the same manner for one of the 1st Brigade's subordinate task forces, TF 1-77. The three direct support Vulcan platoons allocated to the task force are sufficient to cover the force's three companies, the top priority. However, the next priority, a bridge to the rear, is left undefended because of insufficient ADA weapons. Realizing the bridge's importance, the task force commander (TFC) requests additional ADA assets from 1st Brigade, which are granted. One Redeye section, consisting of five teams, is issued a new mission, moving it from the brigade's ammunition point to TF 1-77.

Another item of concern in this situation for the TFC is the use of his DS Vulcan systems in the ground support role, since that can cause a degradation of Vulcan's air defense capability through a shortage of ammunition, or of the proper ammunition. Therefore, the TFC care-

FIGURE 2



AIR DEFENSE ARTILLERY

Continued

fully weighed the estimates of the ground and air situations and directed that Vulcan be used in the ground role for self-defense purposes only.

fundamentals of ADA employment

Now that we have task organized the ADA units for combat, let's examine how and where these weapons are used in both the defense and offense. Since our scenario was based on a division in the defense, we'll consider ADA use in that type of operation first.

Defense Operations

In the defense, ADA supports and assists the maneuver unit as it: destroys or drives off enemy close support aircraft and helicopters; causes enemy aircraft to lose effectiveness through forcing them to release ordnance at other than optimum altitudes, ranges, speeds and attitudes; denies or limits enemy aerial reconnaissance; and provides air defense protection for unit movement in the main battle area.

A most important consideration in accomplishing the foregoing functions is that the corps and its divisions do not have enough air defense artillery to protect all important assets. This forces the allocation of ADA fire units in accordance with the maneuver commander's priorities. *In the defense, dedicated ADA support should be provided to assets such as maneuver units, critical installations such as command posts, combat service support areas, reserves and field artillery battalions.* Air defense artillery units from the covering force must be integrated into the total air defense scheme when the covering force passes into the main battle area. Again, this support should be provided in accordance with established priorities.

". . . mass, mix, mobility and integration . . . each is important . . . emphasis will vary from situation to situation . . . ."

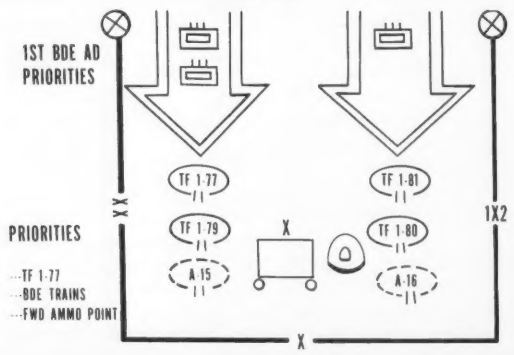
The four specific fundamentals of ADA use—mass, mix, mobility and integration—were also touched on in our scenario discussion. While each is important and is considered and provided for in every operation, their relative emphasis will vary from situation to situation.

In a defensive operation, where enemy penetration and saturation tactics must be countered, the needs for weapons mass and mix generally assume prominence. However, this does not mean that mobility and integration are unimportant nor that they should not be provided for in any defense design.

Where ADA systems are positioned on the ground depends on both tactical and technical requirements and is closely related to what they are defending. This fact must be balanced against the tactical requirement to engage the attacking aircraft before its ordnance release, thereby dictating that the fire units be positioned out from, rather than directly on, the defended asset. Other tactical factors include requirements for balance, defense in depth and mutual supporting distances, which for Chaparral and Vulcan stipulate positioning these weapon systems no farther apart than 2,000 and 1,000 meters, respectively.

Just as with other weapons, ADA systems must see, either visually or through radar, their targets before engagement. Earth curvature as well as terrain and radar masking are primary considerations in this regard and dictate the requirement of either commanding terrain or forward slopes for emplacement. Other technical requirements, varying from system to system,

FIGURE 3



also influence position selection and include backblast areas around all missile system positions (15 meters in the case of Chaparral), 10-degree terrain slope limitations for Chaparral and Vulcan, and line-of-sight communications requirements.

Defensive Maneuver Implications

Implications for the maneuver commander of how and where ADA units are used in the defense are the number of assets defended, terrain allocation, unit signatures, air defense suppression, and liaison and communications.

First, since the needs for AD weapons mass and mix assume prominence in the defense, each asset being defended will be provided a larger number of ADA systems than in the offense. Because there are only so many ADA systems in the division, this means that fewer assets will receive air defense protection in the defense than in the offense.

Next, there are several implications for the maneuver commander concerning where supporting ADA units are positioned. The most obvious of these is that there is only a limited amount of accessible commanding terrain within any area of operation. Positions selected for ADA units are unavailable for maneuver force use and vice versa. This is one of the many areas in which the maneuver commander must balance the needs of his supporting ADA unit against those of his organic and other supporting units, while measuring their contributions to mission accomplishment. Not only must the maneuver commander consider position requirements for the ADA unit dedicated to his support, but he must also consider position requirements for high/medium air defense (HIMAD) units—Hawk or Nike-Hercules—which may be operating in his area and which therefore require the maneuver commander's approval for their position selection.

That commander must also realize the risk that supporting ADA fire units may disclose maneuver positions through visual, electronic or smoke signatures and must weigh the benefits received versus the cost. Should the price be too high, he has the authority to direct his supporting ADA unit to a weapons-hold status, thereby precluding all but self-defense engagements. Additionally, measures taken to reduce unit signatures must be a top training priority for all the commander's units—organic, attached and supporting.

". . . the most important implication . . . is the requirement for liaison and communication between supported and supporting units . . . ."

Another risk the maneuver commander must realize is the possibility of incidental maneuver damage during periods of heavy enemy air defense suppression. Once again, this is an area where he must seek a relative balance between two seemingly conflicting needs, providing his assets as much air defense protection as possible while minimizing the effects of enemy air defense suppression activity on those same assets.

Perhaps the most important implication for the maneuver commander concerning how and where ADA units are used in the defense is the requirement for liaison and communication between the supported and supporting units. To meet that, the supporting ADA commander will normally establish his command post at or near the support unit's CP. Communications are assured by all supporting fire units monitoring the support unit's command net as well as their own nets. Liaison and communication allow the passing of pertinent air defense information from the ADA to the maneuver unit and provide a means for the maneuver commander to pass equally important information to the ADA unit. *The air defense of a maneuver unit is the responsibility of that maneuver unit commander;* consequently, the maneuver unit commander must ensure that supporting ADA elements are fully integrated into all aspects of every operation.

Offense Operations

Moving from defensive to offensive operations, Air Defense Artillery supports and assists the maneuver commander as it destroys enemy high performance aircraft and attack helicopters, causes enemy aircraft to lose effectiveness through premature release of ordnance, and provides suppressive fires against ground targets in specified cases.

As you recall, in the defense the fundamental needs for air defense mass and mix were paramount, resulting in a relatively small number of "heavy" individual defenses. Those requirements change in the offense where the attacker's need for flexibility and speed shifts the air defense focus primarily toward mobility and integration.

Since an attacker is particu-

Continued on page 22

ARMY AVIATION FORCES IN THE AIRLAND BATTLE

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THE AIRLAND BATTLE is a broad body of doctrine that can be broken down into the eight Training and Doctrine Command (TRADOC) mission areas to analyze the potential battlefield as illustrated in figure 1.[1]

Aviation is integral to all of these functional areas and, as such, will be considered in all TRADOC studies and analyses, the conduct of

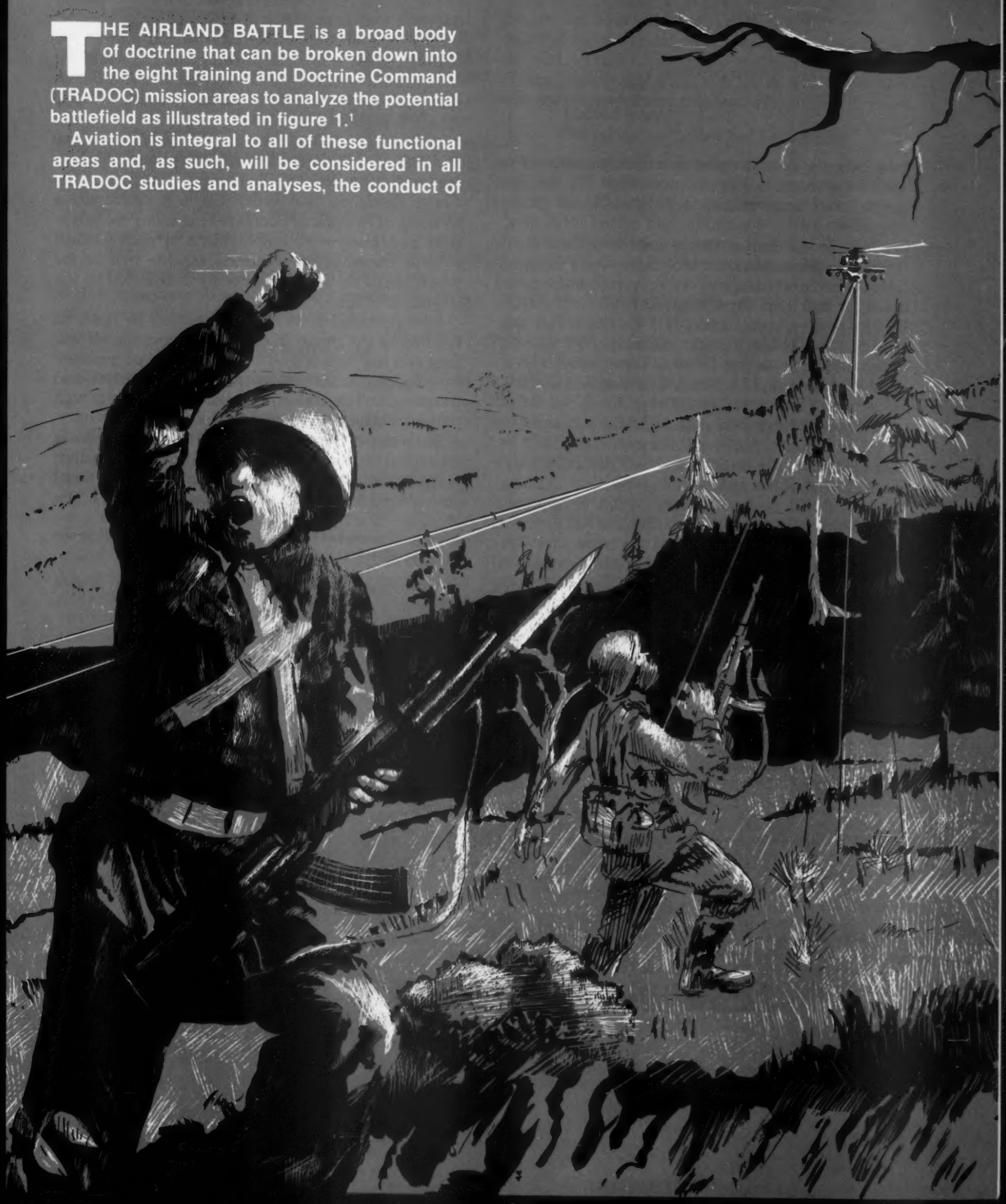


FIGURE 1: EIGHT TRADOC MISSION AREAS

Close Combat
Fire Support
Air Defense
Communications
Command/Control
Intelligence/Electronic Warfare
Combat Support/Mine Warfare
Combat Service Support

the Army Aviation Mission Area Analysis, the formation of Battlefield Development Plan III, the Concept Based Requirements Strategy and in the training process.

This article further disseminates AirLand Battle emerging doctrine to the U.S. Army Aviation community and describes how Army Aviation forces will train for and fight the AIRLAND BATTLE.

These concepts are embodied in TRADOC Pamphlet 525-5, "The AirLand Battle and Corps 86," dated 25 March 1981, as well as General Donn Starry's (commanding general, U.S. Army Training and Doctrine Command) recent article on the "Extended Battlefield" in the March 1981 issue of ***Military Review*** (for reprints contact ***Military Review,*** USACGSC, Ft. Leavenworth, KS 66027); and in General Starry's confidential videotaped briefing entitled "AirLand Battle." These basic references outline an approach to military operations that realizes the full potential of our Armed Forces. Many of the terms and ideas that are depicted in this article have been extracted word for word from these three sources with the intent of adhering to doctrinal discipline and maintaining training standardization.

The AirLand Battle is the result of an evolution in doctrine and is not new in terms of originality. It simply uses more descriptive terms and may at the moment seem somewhat revolutionary considering the attrition oriented, albeit, active defense mind-set that has for some time pervaded our thinking, doctrine and training.

The AirLand Battle concept has evolved from the Extended Battlefield, which was preceded by the Integrated Battlefield, the Central Battle and the Corps Battle, in that order. So it is essentially a blending of two primary notions—extending the battlefield and integrating employment of conventional nuclear, chemical and electronic means—to describe a battlefield on which the enemy is attacked to the full depth of his formations.[2]

The potential enemy we must train to fight, as typified by the threat in Central Europe, the Middle East and Korea, is a modern, well-balanced mechanized fighting force that outnumbers us in men and weapons and is trained to seize and keep a high tempo of offensive actions, Soviet style.

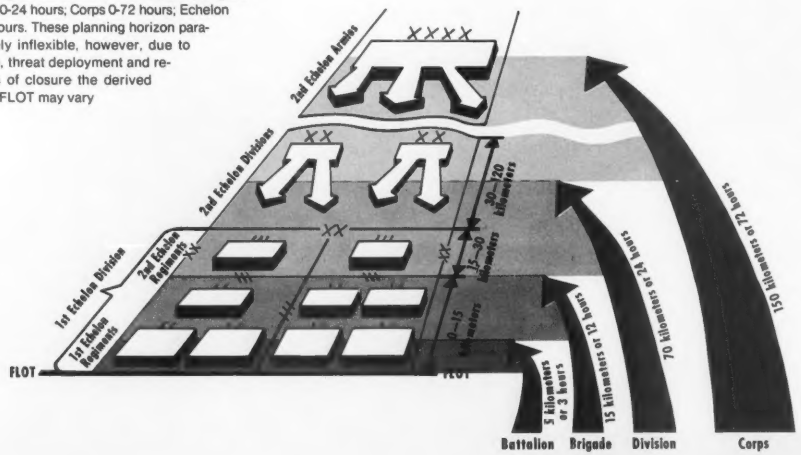
With this threat in mind, what we seek to obtain through this concept is the capability for the earliest possible initiative of offensive action by our combined air and land forces to bring about a conclusion of the

1 Brigadier General Donald R. Morelli, DCS, TRADOC, Letter, ATDO-Z.D, Concept Based Acquisition System, 29 January 1981, pp. 1-3.

2 TRADOC Pamphlet 525-5, "The AirLand Battle and Corps 86," 25 March 1981, p. 2.

FIGURE 2: U.S. CORPS AREAS OF INFLUENCE

*NOTE: Friendly unit areas of influence are dependent upon the following planning horizons: Battalion 0-3 hours; Brigade 0-12 hours; Division 0-24 hours; Corps 0-72 hours; Echelon above Corps 72+ hours. These planning horizon parameters are relatively inflexible, however, due to variations in terrain, threat deployment and resultant threat rates of closure the derived distances from the FLOT may vary



battle on our terms.[3] The leadership of the Army is convinced that a real potential exists now to do this, to fight outnumbered and win, but only if current assets are correctly organized, trained and employed. So, to expeditiously facilitate the necessary training measures that are required the following four-phase program is undergoing implementation:

- Phase I: Major command conferences to formulate basic ideas.
- Phase II: Training and Doctrine Command and major command joint proposals for implementation of priorities and assets.
- Phase III: Joint product provided to headquarters of corps/divisions.
- Phase IV: Service schools/centers produce leaders trained to fight the AirLand Battle.

It is important to note that the Army is already in all of these phases of implementation to some degree.

The Potential Battlefield

The overwhelming superiority in force ratios enjoyed by the threat demands that our operative tactics provide for quick and favorable resolution of the battle to preclude being overrun by follow-on echelons. This would allow our political authorities to negotiate with their adversaries from a position of strength. In NATO (North Atlantic Treaty Organization) nations in particular, we cannot for long trade space for time; in other words, we must plan to deny the enemy his objectives. Furthermore, despite our previous espousal of the active defense, in none of the critical areas of the world would U.S. forces find sufficient maneuver room to conduct a protracted traditional nonlinear defense in depth![4] An excellent example of the distances required for an articulate and successful defense in depth strategy can be gleaned from German Field Marshal Erich von Manstein's 190-mile, World War II counterstroke at Kharkov, Russia which consumed the equivalent distance from Detroit to Chicago. In this same light, the Russian sweep around von Manstein's left flank after Stalingrad was farther than the distance from the East German border through Germany, Holland and Belgium.[5]

Of the three classic methods for breaching a defense —surprise, fire and maneuver, and concentration of forces—the threat can be expected to employ a diversified mixture of all three. However, General Herman Balck and Major General A.D.F.W. von Mellenthin of World War II German Wehrmacht fame consider the concentration of forces, as epitomized by the speed of the attacker, to be the most difficult to defend against.[6] The defense forces must therefore get set well forward to defend against assault echelons and simultaneously destroy, delay, and disrupt follow-on echelons in an attempt to gain the initiative and go on the offensive.

Consequently, when considering the potential battlefield, in order to win we must not only avert defeat but also achieve a definable victory—and quickly! By postulating a victory through offense as our goal, we also accrue a deterrent benefit by assuring enemy leaders that there will be no return to a pre-war status quo for them if they fail to win.

Defining the Extended Battlefield

While competitive numbers of men, weapons and systems are important, of greater concern is their ability to influence the "Schwerpunkt" or critical point in the battle. This influence is related to distance from the forward line of own troops (FLOT) and can be further defined as functions of mobility, weapon's ranges and time, as shown in figure 2. In the AirLand Battle the battlefield is extended in three ways, in depth, forward in time, and lastly in the range of assets employed (assets are extended to include higher level all-service acquisition and attack resources).

Historically, victory in battle has seldom been achieved purely as a result of superiority in numbers or technology. In fact, the employment of resources to their maximum effective influence in the battle has historically been the determining factor.[7] Consequently, the degree of resource employment we will strive to obtain is the simultaneous conduct of the close-in battle and the deep attack of follow-on echelons with continuous planning for maximum use of all conventional, nuclear and chemical capabilities under a single commander at division and higher level. (Note: Brigades are generally not capable of executing deep attacks without reinforcement. However, some independent heavy brigades and air cavalry attack brigades have the inherent resources to conduct deep attack operations.)

The corps commander will have to orchestrate his ground and air forces to create an opportunity to assume the offensive. In the process of deploying his defensive forces the corps commander will have to

3 *Ibid.*

4 General Donn A. Starry, CG, TRADOC, Extending the Battlefield, USACGSC *Military Review* Volume LXI, No. 3, March 1981, p. 34.

5 General William DePuy (USA Ret), General's Balck and von Mellenthin on Tactics: Implications for NATO Military Doctrine, published by the BDM Corporation, McLean, VA, 19 December 1980, p. 23. This report (BDM/W-81-077-TR) was sponsored by the Director of the Office of Net Assessment, Office of the Secretary of Defense, and the Defense Nuclear Agency and addresses among other critical areas of interest such topics as: Smaller Units, Pure Force Composition (below brigade level), Maneuver Strategy, Risk Assumption, Command Functions and Combat Leader Development.

6 *Ibid*, p. 14.

7 General Donn A. Starry, CG, TRADOC, AirLand Battle, TRADOC Videotape #2E-777-8109-B, April 1981, Classified CONFIDENTIAL, distribution is limited.

plan 72 hours in advance, coordinate with precision, execute with offensive violence, and yet beware not to fight piecemeal.

In general, the most decisive offensive is one which strikes with overwhelming force into the enemy's rear and destroys or captures his service support, combat support, and command and control.[8] Attacks set the tempo of the battle and are planned around six basic fundamentals of the offensive:

- See the battlefield.
- Concentrate overwhelming combat power.
- Suppress enemy defensive fires.
- Shock, overwhelm and destroy the enemy.
- Attack deep into the enemy rear.
- Provide continuous mobile support.

If, thus far, these conceptual demands and postulations appear to be wishful thinking or hopeless dreaming, one must observe that the German forces in World War II routinely expected to fight outnumbered by as much as 5:1, often 10:1, yet expected to win, and frequently did. Generals Balck and von Mellenthin have directly attributed their battlefield successes in these circumstances to superior individual soldier traits, quality of unit performance, smaller, more efficient unit organizations, leadership from the front and unity of command.[9]

Battles have been lost by forces that were not only well-deployed but were able to derive maximum effectiveness from all weapons. So ultimately while numbers, technology and deployment are important, intangibles, such as morale and the will to win, can be the deciding factor.

Winning

The successful employment of extended attack by defensive forces, as an alternative to purely defensive actions behind the FLOT to avert defeat, has been amply and dramatically demonstrated by the Israeli armed forces in several recent "come as you are" wars. Although maintaining a posture of defense, to win, all of our units must be prepared and inclined to act offensively despite that defensive posture.

Maneuver and logistical planning must anticipate enemy vulnerabilities that are created by our actions in the close-in and deep attack battles. To do this, leaders must be adept at interpreting the concept of operations of units one level higher than their own. Additionally, leaders must willingly assume risks commensurate with the desired payoff. Put another way, the more formidable the opponent, the greater the need for a daring venture of calculated risk.

Deep attack of all enemy echelons is ultimately the unifying idea we must grasp to realize our full potential for winning a definable victory. There are three primary tools for conducting deep attack:

- Interdiction by air, artillery, special forces.
- Offensive electronic warfare.
- Deception.

The tactics of American football can be used to demonstrate the desired results of the AirLand Battle. The combined arms team is used to block the enemy's kick (massive firepower) whenever possible. By sacking his quarterback with command, control, communications and intelligence (C^3I) we create uncertainty and slow his drive short of the line of scrimmage (FLOT). Interceptions, fumbles and injuries (reducing enemy alternatives) allow us to seize the ball (initiative) and go for the long shot (tactical nuclear release authority and/or the offensive) and ultimately the game (win).

Currently, our air forces are better suited—through inherent system's mobility, firepower and C^3I capabilities—to conduct deep attack operations than other combat organizations. Additionally, the following near-term and future Army Aviation systems will further enhance the ability of the combined arms team to conduct deep attack in the AirLand Battle.

SEMA

Special electronics mission aircraft (SEMA) allow the commander to see the battlefield far beyond the FLOT. The better he sees the battlefield the more surely he can concentrate his forces or employ economy of forces at the right time and place.

The improved GUARDRAIL system (RC-12D) provides communications intercept, exploitation and emitter locating capabilities at corps level. The QUICK FIX IIB (EH-60) will be welcomed as the first true division level electronic warfare system. It will be able to disrupt the integrity of threat communications networks as well as provide protection against hostile radar emitters.

The QUICK LOOK (RV-1) currently provides a corps level system which conducts visual reconnaissance and monitors opposing force radar emitters while simultaneously retransmitting that data to ground processing facilities for quick processing and dissemination. The Side Looking Airborne Radar (SLAR, OV-1D) complements QUICK LOOK at corps level with near realtime radar imagery of both fixed and moving targets, in addition to infrared (IR) imagery and photo recon functions.

The Heliborne Standoff Target Acquisition System (SOTAS) will be mounted on an EH-60 to further round out the commander's ability to see far beyond the FLOT. SEMA systems and capabilities enable us to allocate resources to attack threat weaknesses

8 FM 100-5, "Operations", HQDA, Washington, DC, 1 July 1976, p. 4-6.

9 DePuy, *Op. cit.*, pp. 38-49.

and concentrate forces against threat attacks.

AHIP

The Army Helicopter Improvement Program (AHIP) is developing an improved scout helicopter that is more capable of fighting in conjunction with the attack helicopter. It will provide improved battlefield reconnaissance, realtime information, security, aerial observation and target acquisition/designation systems during day, night and reduced visibility operations. To enhance its effectiveness in the high threat environment, improvements will emphasize tactical terrain flying, electronic countermeasures, an air-to-air self-defense missile system, and vision-enhancing equipment for more effective target detection, acquisition and handoff. The mast-mounted sight (MMS) provides standoff target acquisition and laser designation systems that will allow scout helicopters to remain masked for reconnaissance, surveillance, artillery observer and target acquisition missions. The MMS will also provide visionics more compatible with AH-1S and AH-64 capabilities.

AH-1S

The AH-1S fully modernized Cobra currently being fielded will be an integral part of the Army's attack helicopter force through the year 2000. The AH-1S can carry 8 tube-launched, optically-tracked, wire-guided (TOW) missiles, 320 rounds of 20 millimeter (mm) and 14 70 mm (2.75 inch FFAR) rockets in the European environment. In an alternate mission configuration, the aircraft can carry up to 76 70 mm rockets for multiple battlefield effects such as high explosive, illumination, smoke and multipurpose shaped charge submunitions. When fielded, the Forward Looking Infrared Augmented Cobra TOW Sight (FACTS) will provide the AH-1S attack fleet with an enhanced target engagement capability under night and obscured visibility conditions.

AH-64

The AH-64 advanced attack helicopter will provide the Army with an improved capability to influence the battle over a broad front and the flexibility to accomplish the mission during day/night and adverse weather conditions. The AH-64 can be armed with as many as 16 HELLFIRE missiles in addition to its rapid-firing, armor piercing, 30 mm cannon which has a maximum effective range of 3 kilometers. Alternate mission configurations for the AH-64 include armament loads of up to 76 70 mm rockets or a combination of HELLFIRE, 70 mm rockets and 30 mm rounds. Reliability, availability and maintainability have been built into the AH-64 from the ground up; furthermore, the AH-64 has been designed so that it is nearly invulnerable to 12.7 mm and is highly resistant to 23 mm rounds. The Pilot's Night Vision System (PNVS) will enhance the AH-64's night/adverse weather capability, denying the advantages of limited visibility to the enemy. In concert with the Target Acquisition and Designation System (TADS), the PNVS will enable the AH-64 to fight in conjunction with the M-1 tank and engage enemy forces around-the-clock.

UH-60

The UH-60 Black Hawk is our new firstline utility-assault helicopter that will provide extended range, speed and payload for increased logistics and mobility capabilities. The Black Hawk will be used primarily in the main battle area as a squad-carrying and logistics aircraft. It will be organic to combat support aviation companies and air cavalry troops and will replace the UH-1 Huey on a two-for-three basis. The UH-60 will enable the ground commander to make the offense a viable operational concept by conducting air assault raids, rapid movement of antiarmor temas, rapid resupply throughout the battle area, and rapid deployment of rear area security forces in response to enemy airborne and airmobile operations.

CH-47D

The CH-47D Chinook modernization program will provide a helicopter that will meet the medium lift transport needs of the 1980s and 1990s. Major modifications are being made to the CH-47 that will allow it to operate with internal or external loads of 25,000 pounds on a standard day. The CH-47D will play a vital role on the modern battlefield, particularly in the conduct of high priority tactical airlift to maneuver forces that will be widely dispersed to avoid becoming potential nuclear or chemical targets.

Strategic Deployability

The capability of selected Army aircraft (AH-64, UH-60, CH-47) to self-deploy to a distant battlefield or throughout extended battlefields is realizable now as demonstrated in August 1979 by "Operation Northern Leap." During that exercise four CH-47 helicopters flew from Ft. Carson, CO, to Heidelberg, Germany. Within 30 minutes of their arrival in Germany, the CH-47s flew their first mission in support of United States Army, Europe. With regard to rapid deployment forces, Major General John W. McEnery (chief of staff, U.S. Army Forces Command) recently identified heliborne elements as a most effective option force for use in a rapid deployment role because they are least hindered by terrain and most capable of attriting

and even stopping attacking threat forces on an extended battlefield.[10] In short, existing and planned aviation units such as the Air Cavalry Attack Brigade (ACAB), due to their modularity and composition, act as a natural nucleus for a small but potent rapid deployment force.

Aviation Contribution to AirLand Battle Now

Army Aviation forces through the application of maneuver, speed, superior firepower and economy of force will make significant contributions to the integrated conduct of the close-in "LandAir" battle and deep attack interdiction in the extended AirLand Battle. (Note: The close-in battle is primarily a land battle with support from air forces. The term LandAir is quoted from General Starry's videotape.) Furthermore, this capability is inherent in aviation unit organizations and equipment now. Engagement of first echelon threat divisions by our forward divisions today would witness divisional aviation's current superior capability to destroy, delay and disrupt the threat. As stated earlier, aviation forces are integral to all eight TRADOC mission areas and will play a key role in developing the battlefield. More specifically, in the covering force area and the main battle area of the close-in battle, current and near future divisional aviation elements, such as the ACAB, will perform the following typical missions:

- Close Combat—target acquisition, processing, attack and attack assessment by attack helicopter teams, joint air attack teams (JAAT), air cavalry and air assault forces.
- Fire Support—extended target acquisition primarily by SOTAS; target attack, counterfire and interdiction with long range and precision guided munitions by scout and field artillery observation aircraft; with target damage assessment by attack, scout and SEMA aircraft.
- Air Defense—primarily by scouts armed with lightweight air-to-air missiles and attack aircraft.
- Combat Support, Engineer and Mine Warfare—primarily by utility, medium lift and utility minelaying/countermine (aerial mine detection) aircraft.
- Intelligence and Electronic Warfare—primarily by SEMA and scout aircraft with additional support from air cavalry aircraft.
- Command and Control—facilitated primarily by scout, utility and operational support aircraft.
- Communications—electronic, visual and message communications capabilities facilitated by virtually all aircraft.
- Combat Service Support—battle support, reconstitution and force movement primarily by utility, medium lift and operational support aircraft while attack and scout aircraft provide protection during the conduct of those tasks.

A quick look at the fundamentals of tactical employment for aviation systems/forces reveals that they differ little from ground fighting techniques. In mounted warfare the tank is the primary offensive weapon.[11] Consequently, aviation elements and all other elements of the combined arms team must be employed to support and assist the forward movement of tanks. Considering the mobility advantage that the M-1 tank has demonstrated over our other ground vehicles, the possibility cannot be discounted that M-1 equipped units may out-drive their combat support and combat service support elements. In this contingency, aviation forces may be the only means of providing M-1 tank units with the security, fire support and even logistical resupply demanded by a thrust for deep objectives.[12] As armored units move forward aviation units will support and assist them by:

- Guarding open flanks.
- Reinforcing in event of enemy counterattacks.
- Deepening penetrations.
- Sweeping around flanks to hit enemy reserves.
- Overwatching and providing fire support against enemy elements.

Although not all inclusive, the following critical aspects of employment should be common considerations for all aviation elements.

- Combined arms team employment optimizes effectiveness.
- Terrain flying is essential.
- Engaging from maximum effective range, with minimum exposure time to threat ADA (air defense artillery), is essential.
- Critical threat targets must be killed in priority.

In the deep interdiction of the follow-on echelons, Army Aviation, in conjunction with the combined arms team under the direction of the corps commander, will conduct low level, high speed attacks well beyond the forward line of own troops by flying below the minimum engagement altitude of rear area threat air defense systems to interdict critical second echelon threat combat elements. Divisional elements of the combined arms team—artillery, attack helicopters, Air Force close air support aircraft and joint air attack teams—will engage targets beyond the FLOT out to the maximum effective range of divisional artillery (approximately 24 kilometers). Corps Army Aviation forces and Air Force offensive air

10 Major General John W. McEnery, CofS, FORSCOM, Talking Paper: The Rapid Deployment Force, undated, p. 3.

11 *Op. cit.*, p. 4-7.

12 *Ibid*, p. 4-11.

support aircraft will engage threat second echelon forces beyond the area of influence of divisional artillery in an effort to disrupt or destroy threat avenues of approach, C^3I, airfields, assembly areas, logistics and nuclear targets.

The operational demands of fighting outnumbered will require careful consideration for deep target acquisition and accurate target value analysis. The employment of joint air attack teams and other scarce systems must be planned with precision to coincide with expected windows for offensive action. These windows for offensive action will include the coordinated early release of tactical nuclear weapons, with careful consideration for the earliest time when release could possibly be expected and the optimum or latest possible time for use of nuclear weapons. This window for nuclear release would put critical threat second echelon forces within 24 to 60 hours of the FLOT.[13]

Fighting outnumbered will also put severe demands on our limited assets and will require us to be innovative and maximize our resources. Some of the methods that could be developed to support the required extended range capability are: auxiliary fuel tanks on aircraft, CH-47D fuel tanker accompaniment or rendezvous with the attack force, and even air-emplaced FARP (forward arming/refueling point) operations beyond the FLOT in enemy country.

In light of the fact that potential targets far outnumber available delivery systems, target prioritization and close monitoring of subsequent ammunition rates without restricting weapons employment and operational capabilities will be necessary. Furthermore, of critical importance to the employment of aviation systems in a nuclear/chemical contaminated environment will be the requirement for nuclear/chemical protective planning and equipment for aircraft and personnel prior to H-hour.

How to Train—Now

Using TRADOC Pamphlet 525-5 and the "How to Fight" series of field manuals, we must train now as we intend to fight with today's forces and equipment. This training should include (but is not limited to) the following five requirements: *FIRST*, establish management of sensor assets by those who will employ them in war. *SECOND*, develop and utilize integrated target analysis cells at division, corps and theater level. *THIRD*, anticipate lack of dispersion in enemy second echelons and plan to attack these concentrations continuously. *FOURTH*, train air forces in timely and responsive deep target acquisition and attack. *FIFTH*, conduct corps and division level exercises that stress the following fundamentals: the issuance of mission orders, the development of team and unit skills, and ultimately the spirit of the offense.

Army Aviation must, and will, confront the demands of the AirLand Battle with enthusiasm and conviction. The challenges implicit in our job of preparing for the next war demand that we forecast and produce the required airframes, weapons systems, munitions and supplies. We must ensure that our forces are trained to perform on the battlefield around-the-clock, with current and projected systems. Developmental units such as the ACAB are being tailored to meet these needs.

The AirLand Battle is not a future experiment pending acquisition of new systems. Corps and divisions can and must train now to fight on the AirLand battlefield. As new systems are fielded and integrated into the force structure, our operational capability will be further strengthened. In the meantime we must maintain the momentum established during implementation of Phase I of the AirLand Battle and achieve as quickly as possible the objectives of Phase IV—that is, ensuring that our aircrews leave the training base ready for their respective roles on the battlefield.

Army Aviation is in a unique position to fight what the Chief of Staff of the Army, General E. C. Meyer calls the "Three Days of War":

- *To deter the day before the war.*
- *To fight the day of the war.*
- *To terminate conflict in such a manner that on the day after the war, the United States and its allies enjoy an acceptable level of security.*

Army Aviation forces will play a key role as a member of the combined arms team in winning the "Three Days of War" in the AirLand Battle.

13 Starry, *Military Review*, *Op. cit*, p. 41.

Although not specifically cited in the text, the following references are included in the bibliography of this article.

- COL John C. Bahnsen, "USA Attack Helicopter Fundamental Tactics," *Aviation Digest*, Vol. 25, April 1979.
- Brereton Greenhous, "The Armor-Aircraft Interface: An Historian's Perspective," *RUSI Journal*, September 1979.
- General Frederick Kroesen, CINCUSAREUR, Remarks to Symposium on Nonmechanized Infantry, Haus-Rissen, Hamburg, FRG on 30 April 1980. General Kroesen's remarks on infantry-armor force mix considerations impact on aviation force composition also and lend further credence to the observations of General's Balck and von Mellenthin.
- Army Aviation RDTE Plan, Ninth Edition, October 1980. Copies may be obtained from the Directorate for Advanced Systems, AVRADCOM, 4300 Goodfellow Boulevard, St. Louis, MO 63120; distribution is limited.
- General William E. DePuy (USA Ret), "FM 100-5 Revisited," *Army*, November 1980.
- John C. F. Tillson IV, "The Forward Defense of Europe," USACGSC *Military Review*, Vol LXI, No. 5, May 1981.
- Lieutenant General William R. Richardson, DCG TRADOC, "Winning on the Extended Battlefield," *Army*, June 1981.

REPORTING FINAL

Late News From Army Aviation Activities

FROM FORT RUCKER

Daedalian Award. Combat Skills I Branch, Lowe Division, Department of Training and Doctrine, has received the Army Training and Doctrine Command (TRADOC) Daedalian Army Aviation Flight Safety Award. Captain Calvin E. Ball, branch commander, accepted the large silver trophy, plaque and citation from Brigadier General Richard A. Ingram, commandant of the Air Command and Staff College, Maxwell Air Force Base, AL.

The award is presented annually by the Order of Daedalians, one of America's oldest professional aviation organizations, to the TRADOC aviation unit with the best flight safety record and aircraft accident prevention program during the fiscal year. Combat Skills I flew over 30,000 accident-free hours during fiscal year 1980.

WOC Hall of Fame Remodeled. The Warrant Officer Candidate Hall of Fame has been remodeled to create a new wing commemorating Army warrant officer aviation participation in the Vietnam conflict. The new area features a display of individual brass plates for each of the 1,183 warrant officer aviators who died in the war, from the first, Warrant Officer, WO1, Joseph A. Goldberg who was killed in action in 1962, through the last, Chief Warrant Officer, CW3, Larry A. Zich who was carried as missing in action until November 1979 when his status was changed to KIA.

Specialist 5 Thomas E. Missildine, who is attached to the 62d WOC Company for duty at the Hall of Fame, was in charge of the remodeling. He said that all materials used in the job were donated or purchased by donations, and all the work was done by warrant officer candidates.

The WOC Hall of Fame is open from 0900 to 1100 and from 1300 to 1600 Mondays through Fridays. It is not normally open on weekends; but should a group wish to visit the hall on a Saturday or Sunday, arrangements can be made through the 62d WOC Company, telephone 255-2810. Chief Warrant Officer, CW2, David Brubach is the curator. **(USAAVNC-PAO)**

FROM ALABAMA

Logistics Meeting. The Society of Logistics Engineers will hold its 16th annual symposium 26 to 28 August in Seattle, WA. Its theme, "Modern Logistics Technology," will embrace the broad spectrum of logistics, both commercial and military/aerospace. For further information, contact Keith B. Kittle, symposium general chairman, P.O. Box 58202, Seattle, WA 98188, or Robert R. Leonard, Society of Logistics Engineers, Suite 922, 303 Williams Ave, Huntsville, AL 35801, telephone 205/539-3800/3833.

FROM GERMANY

59th ATC Battalion Wins Awards. The 59th Air Traffic Control Battalion, assigned to Germany and commanded by Lieutenant Colonel Bert Hervey, has been recognized by the Army Aviation Association of America as the USAREUR Aviation Unit (small unit category) of the Year for 1980. Two members of the battalion's 240th ATC Company, Specialist 5 Charles E. Ledford and Sergeant First Class James Mooney, also received awards as, respectively, the ATC Maintenance Specialist of the Year and the USAREUR Air Traffic Controller of the Year. **(Rickey Harris)**

FROM WASHINGTON

Symposium. The 52d Shock and Vibration Symposium will be held 27 to 29 October in New Orleans, LA. Host will be the Defense Nuclear Agency with the cooperation of the Army Waterways Experiment Station. Papers relating to the many aspects of shock and vibration technology

Brithday Cake. The Army Aviation Center celebrated the 39th birthday of Army Aviation at a party in June sponsored by the Army Aviation Association of America at Ft. Rucker, AL. Cutting the cake are Major General Carl H. McNair Jr., left, commanding general, Ft. Rucker, and Brigadier General Robert M. Leich (Ret.), AAAA national awards board chairman

photo by SP4 Denise Starr

are solicited. For further information contact: The Shock and Vibration Information Center, Code 5804, Naval Research Laboratory, Washington, DC 20375: AUTOVON 297-2220; commercial 202-767-2220. **(VBIC)**

HSM Approved. The Humanitarian Service Medal has been approved as a means to recognize personnel who participated in the following operations: Liberia Coup D'Etat, 12 April to 22 May 1980; Wichita Falls/Vernon, TX, Tornado Disaster Relief, 10 to 21 April 1979; Haiti Hurricane Relief, 6 to 21 August 1980; Jackson, MS, Flood Disaster Relief, 8 April to 9 July 1979; Grand Island, NE, Tornado Disaster Relief, 3 to 18 June 1980; Nicaraguan Evacuation of Noncombatants, 11 June to 31 July 1979. For further information call AUTOVON 221-8698/8699. **(MILPERCEN)**

(U.S. Army photo)

New Tower. This new standard air traffic control tower (background) is shown next to the original at Libby Army Airfield, Ft. Huachuca, AZ. The new tower is prefabricated and is an Army standard. Towers identical to this are under construction or in use at Ft. Polk, LA; Wheeler Air Force Base, HI; Ft. Leonard Wood, MO; Ft. Knox, KY; and Ansbach, Germany

FROM VIRGINIA

Civilian Schooling for Army Officers. Annually, the Department of the Army budgets more than $3 million for educating warrant and commissioned officers to the associate, undergraduate and masters level. This amount is used for funding approximately 440 officers in fully funded programs and more than 400 in partially funded programs. In addition to satisfying personal educational goals, these programs provide the Army with the capability to fill about 4,500 positions validated as requiring graduate education for job performance.

Fully funded civilian education programs provide the major source of degrees in the scientific, engineering and other "hard skill" shortage disciplines that the Army requires.

Partially funded civilian education programs provide a number of Army personnel with an opportunity to obtain their academic degrees within a short period of time at minimum cost to the Army and the individual. In addition to satisfying personal educational goals, these programs provide the Army with the capability to fill positions validated as requiring graduate education for job performance. In recent years, many of the partially funded programs have been underutilized while individuals go to school in an off-duty status. True, there are certain limiting requirements (shortage discipline, specialty supporting, etc.); however, these are minimal and not difficult to meet.

To prepare for education in a shortage discipline, a solid background is generally needed in math through calculus and/or at least one foreign language. If your proficiency in these areas is weak or nonexistent, you should be enrolling in these courses off-duty so that you are better qualified for graduate study later. You must remember that attendance is competitive and you should do everything possible to be fully qualified.

For more information write HQDA MILPERCEN, ATTN: DAPC-OPP-E, 200 Stovall Street, Alexandria, VA 22332 or call AUTOVON 221-0685/8100 or commercial (202) 325-0685/8100. **(DAPC-OPP-E, Majors Sharp and Richey)**

FROM CONNECTICUT

Rescue Award. A redesigned Sikorsky Helicopter Rescue Award consisting of a citation and gold pin is now available for helicopter crewmembers who perform a lifesaving mission in a Sikorsky helicopter.

Military and civilian pilots and other crewmembers who meet that criterion should be recommended for the award by their commanding officer, a company official or other authority. Details of the rescue should accompany the recommendation. Each person nominated for the award must have been aboard the helicopter involved at the time of the rescue.

Forms for making the recommendation are available from the Awards Board Secretary, Sikorsky Aircraft, Stratford, CT 06602.

VIEWS FROM READERS

Editor:

As one of the Army's "part-time" fixed wing aviators, I have a vested interest in the peculiarities of fixed wing flight. While I was reading the December 1980 copy of the ***Aviation Digest*** I came upon Stanley Grayson's article, "How To Avoid The Vmc-Related Accident." It reminded me of an article that my instructor gave me to read during my "twin transition." But credit should go to Mr. Grayson because his was quite a bit better—so much so that I mailed my copy to my "old" flight instructor.

As my copy of Vmc is now in the mail, I'd like to request a reprint of that article. Additionally, I missed the two first articles in the series, "The Flat Spin" and "Spin Awareness" and I'd appreciate it if you could also send me those two articles. If they are as good as the Vmc articles I'll probably be hitting the Xerox machine to make reprints!

In conclusion, I'd like to say that the ***Aviation Digest*** keeps getting better every day. The "Threat" series and vehicle/aircraft identification series also has been great. But the one topic that really gets me going is aerodynamics and flight technique. This is probably why I liked the articles I requested so much. Keep up the great work.

CW2 Bradford A. Powell
E Co, 501st Avn Bn (Cbt)
APO New York 09326

Editor:

C'mon guys, get your stuff together! You've really outdone yourselves with the quality (or should I say lack thereof) exhibited by your proofreading of the February 1981 issue. Let's start with the photo on the top of page 3. I realize the USAREUR should be getting the bulk of the newest and most combat-ready equipment that is available, but an AH-1 that has the capability to fire two, that's (2), TOW missiles at the same time? Amazing! In addition, the TOWs in question look suspiciously like 2.75 inch FFARs.

The article on page 38 is very informative, but the photo on the same page creates some confusion. Since when did the UH-1 get so skinny, and grow crosstube fairings, too?

All kidding aside, the information provided to the Army Aviation community by the ***Aviation Digest*** is top-notch. I have been an avid reader since 1964 and look forward to more of the same. Keep up the good work.

SSG Gerald D. Kimel
U.S. Army Safety Center
Ft. Rucker, AL

• You're right—in both cases. Those are 2.75 inch rockets; they were fired from launchers mounted inboard from the TOW tubes visible in the photo on page 38; the dolly is under an AH-1 Cobra. We appreciate your calling the errors to out attention (when it rains, it pours) and regret any difficulties it may have caused any of our readers. We also appreciate your kind remarks. Editor.

Editor:

Women are vital to the aviation battlefield of tomorrow. Traditionally, we have denied women a combat role. This denial is because of some very logical, sound reasoning, and some not so sound. Women are the givers of life, we can't ask them to take life away. Very sound, logical, emotional reasoning.

Women are inferior to men. They are weaker physically. They are weaker psychologically. They are weaker emotionally. They are not as intelligent as men. Women can't handle stress as well as men. Quite possibly we are just a little afraid to have women in combat. Margaret Mead expressed this thought rather aptly in the August 21, 1972 issue of the ***Teacher College Record:***

> It is possible that the historic refusal to give women weapons . . . may be due not to a rejection of putting the power of death into the hands of those who give life, but rather because women who kill . . . are more implacable and less subject to chivalrous rules with which men seek to mute the savagery of warfare. It may be that women would kill too thoroughly and endanger the negotiations and posturings of armies, through truces and prisoner taking, with which nations at war eventually manage uneasy breathing spaces between wars.

In nature, is not the Mother defending her young the most ferocious combatant? The male world maintains that women are just not capable of fulfilling the combat role. Most women do indeed have a physical handicap, but, only as far as upper body strength is concerned. Consider the other areas that women are said to be inferior in.

There are too many reports, statistics, surveys and studies, that analyze women, to list. Suffice it to say the end result, in my opinion, is that women, generally, are better suited for a given job than men. Women have quicker reflexes, better endurance, are more emotionally stable than men, ad nauseum. Given the same education and opportunity, a woman is at least as qualified as her male counterpart. Not to mention, there is a historical precedent too.

Articles from the *Aviation Digest* requested in these letters have been mailed. Readers can obtain copies of material printed in any issue by writing to: Editor, *U.S. Army Aviation Digest*, P.O. Drawer P, Ft. Rucker, AL 36362

During World War II women made available more men for the combat roles. In their desire to aid the war effort in any way they could, women took over the industry. Women manufactured a large percentage of our nation's war materials. The Women's Airforce Service Pilots (WASPs) provided a valuable service to the military. These women were instructor pilots for the males in the military. They towed targets, made test flights and delivered new and sometimes barely airworthy aircraft to all theaters of the war.

Today women are even more involved in aviation than during the war. Today women are pilots on commercial airlines, some as captains. Today all branches of our military use women as noncombat duty only pilots. NASA has several superbly qualified women involved in the space program right now as astronauts. There is no doubt that women are capable of doing any job that they are qualified for. Of about 2 million people in the military, 95 percent are male. Of about 28 million women ages 18 to 35 in the United States, only 97,000 women are in the armed services. That is a very large, untapped resource that the military can't ignore.

We must fully integrate women into all aspects of the military if we are to properly use all of the assets available to us. To fail in this respect is discriminatory to all. Discriminatory to the men in that it places the entire burden of combat on the men. It also denies men the opportunity to serve during peacetime in the more desired assignments because women are always filling those jobs. Discriminatory to the women in that it prohibits them from being fully participatory members of our military. As a result, men will resent women, especially in aviation, until women do all that the job entails, not just selected portions. This is not a legal matter as some believe. No laws exist that prohibit women in combat roles, only policies existing at this time.

We need these women to fill these jobs because there aren't enough men joining the military to allow past prejudices to continue without jeopardizing our national security. We can no longer protect our women from war. Civilian population centers will be targets of destruction during future intercontinental warfare. Women will be among the first casualties of that disaster. Women are vital to our future military strength. Our very survival may depend on them.

CW3 John E. Thomson
Ft. Rucker, AL

Editor:

Although this is entitled "My Son" I would like to dedicate this to all the young women and men graduating in this class on behalf of their parents and/or husbands and wives.

To: LT Robert C. Adams

MY SON

It was nine months ago with hopes so high
That you started your class on how to fly
This was your dream when you were young
To be an Army pilot some day, my son
We've talked about so many things
The books, the maps, the silver wings
And then one day you said to me
"I forgot to tell you about my I.P."
What you said was a shock to me
'Cause I never thought anyone
Would speak that way to you, my son.
I'm sure there were times you wanted to say
"Please, Mr. I.P., don't stare at me that way,
'Cause I'm as nervous as I can be."
Oh! dear God, I wish that he
Would have a little more patience with me
I'm trying so hard to learn
And remember what you say
About the main rotor and tail rotor
That keep Huey in the air that way
I'm flying now, sir, and I know
The collective and cyclic are in control.
So thanks to you, Mr. I.P. for being his guide all the way
The night flying and cross-country trips he made
Passed the instrument test you gave
And finally, tomorrow is his graduation day
So now, my son, I'd like to say
When you are at the controls and on your way
Plan your flight and recheck your plans
And trust your instruments, you know you can
Remember your variation, deviation and winds aloft
Stay clear of those thunderstorms and frontal troughs.
And with fond memories in your heart
A permanent change of station you are about to start
With so much pride and a job well done
This was your dream when you were young
It's Fort Polk—here you come
You are cleared for takeoff so give her the gun.
Congratulations and best wishes, my son.

All my love,
Mom
April 28, 1981

Mrs. Kenneth D. Adams (Marie)
4970 Prieto Dr.
Pensacola, FL 32506

Editor:

Fledgling aviators are being graduated from Ft. Rucker now at close to 1,000 per year, and my unit received 12 of them within a 3-month period. This letter is to them.

An aviator has wings, but a pilot flies. And to fly, the pilot must overcome three hurdles:

A new pilot must approach flying with his eyes wide open. He must have fear, respect and absolute assurance. Flying any other way is a mistake. Leaving any one of these on the ground will cause him to live to regret his steps. The pilot who takes these with him will never suffer defeat, and his actions lose the blundering quality of a fool's hapless performance.

When we first enter flight school, we are not really sure what to expect. Our intentions are vague, and our objectives are not clearly defined. We have hopes that will never materialize because we have no idea of the difficulties we will encounter in learning to fly. Our progress follows the normal learning curve. It is slow at first. Then, bit by bit, it comes together, and later, we learn rapidly and things finally start to fall in place.

But soon enough, the neat picture painted at flight school gets muddled. The artificial constraints are not in place in most field units, and our expectations soon clash with reality. In "real" flying, the Aviation Center cannot prepare an aviator for every unforeseen situation. After one or two unpleasant, perhaps dangerous, experiences, we actually begin to develop a fear of flying. Our learning halts. Flying is not what we expected. Every flight becomes a new, potentially dangerous experience, and fear, without compassion, begins to intensify. We find ourselves asking, "Is that what I really want to do?"

And so, we reach our first hurdle, fear. If at this point the pilot begins to shun missions and find nonflying jobs, little usually happens to him. He simply stops being a pilot. He is, of course, defeated, and our units have those types in them. Like penguins, they have wings but don't fly. Having been defeated in their flying efforts, they sometimes behave like failures in their other jobs' areas. The first hurdle has ended their learning.

Fear is perhaps the greatest hurdle and is never really completely overcome. Fear will always be waiting, and the pilot can succumb to it in his first or fifteenth year. Three examples of this are a CW2, a CW3 and a CW4 whom I know. I'll call them Tom, Dick and Harry. Tom, the CW4, ran afoul of some thunderstorms, and when he finally landed, the refuel pump read 196 gallons into a UH-1. Dick, the CW3, whited out in a blizzard and left a neat set of 100-foot long parallel lines in the snow. Harry, the CW2, was defeated by the isolation of flying in Alaska. These three now spend their time doing other jobs and only fly to make minimums.

To overcome fear, the pilot simply must not run away. He must face his fear, take a deep breath and shake it off. And even though he has it with him always, he must fly again and again. And a moment comes when he is above the first hurdle.

But then he meets the second. Actually, as with fear, it was and always will be there. The second hurdle is to comprehend the big picture—how terrain and weather will affect his flight, what passenger to pick up, where to go, how to navigate, fuel and distance calculations, and all the other myriad things that could turn a successful mission into a harrowing experience. Once the pilot has the big picture, he will never doubt his actions. He will have self-assurance and clarity of mind. He can do what he pleases because he can see clearly to the end of his actions.

And in the second hurdle lies the third. In the development from novice to expert, he has defeated fear and obtained the big picture. He feels he can do as he pleases without fear, and so comes the final hurdle—power. As the history of the world shows, power is the highest of all hurdles. In the case of a pilot: He has conquered fear and learned enough to conceptualize the big picture, but now, what is he going to do with it?

The most tempting reaction is to give in to it because, after all, he feels truly invincible. He can do whatever he pleases. He commands; he begins by taking risks, cowboying, and in the end, he is making all the rules because he is a master. The pilot who succumbs to power is at first flamboyant and clownish. He later becomes cruel and capricious.

To overcome this hurdle, he must simply be aware. Aware that in truth he has never completely overcome his fear and will never completely obtain the big picture. He must discipline himself at all times. The challenge is not to see how much he can get away with and live. The challenge is instead to operate at all times without fear and with complete understanding. If he does not give into his power but instead redirects his expertise toward the mission, he can truly be said to have become a mature pilot.

CW2 Brandon L. Tolbert
A Co., 501st ABC
APO New York 09326

Editor:

Reference the article "Out I Went!" in the March 1981 ***Aviation Digest.***

Several publications have printed the story of Mr. Tobin's plight, all portraying him as a hero for having survived under somewhat adverse conditions.

It might better serve the aviation safety community if one additional fact is printed. Mr. Tobin was not authorized to be performing crewmember duties at the time of his mishap. Had he been properly qualified prior to the flight the incident might never have taken place. Supervisory error first class!

Incidentally, there used to be a safety chain on U-21 doors to prevent this type mishap. They were removed a couple of years ago (an engineering improvement) because "we never have that kind of problem."

Colonel Derald H. Smith
DARCOM Aviation Officer
U.S. Army Troop Support and
Aviation Materiel Readiness Command
4300 Goodfellow Boulevard
St. Louis, MO 63120

• Editor's Note: It was directed in February 1980 that the safety chain be removed from the door of the U-21 Ute because the National Transportation Safety Board and the Army Safety Center determined that the chain could be an inpairment to ingress and egress in case of an accident. Directions were given in a message from the Army Troop Support and Aviation Materiel Readiness Command, St. Louis, MO.

Editor:

The following is submitted for publication in the ***Aviation Digest:***

"CAPTAIN CURIOUS"

Your article "Out I Went!" in the March 1981 issue of the ***Aviation Digest*** prompted me to recall an incident of similar nature. The names used are fictitious, but the incident is not, and may be of some interest to U-21 Ute pilots curious about the in-flight characteristics of U-21 doors.

I do not remember the exact date; however, it was either November or December of 1970. I was assigned as a U-21 instructor pilot in the command aircraft company, Long Than, Republic of Vietnam (RVN), and was discussing some standardization policies with the unit standardization instructor pilot who was about to return to the States. Since I was to fill his position, we were deeply involved in conversation that evening in his room when in burst CPT Tom Newby. He was terribly upset and wanted to talk to us about his flight that day with CPT "Curious" Murphy.

They had flown several passengers to Da Nang that morning in a U-21 and were dead heading back to Long Than at 10,500 feet (feet wet) down the coast of RVN. CPT Curious, who was the aircraft commander (AC), had been doing his homework by reading the U-21 operator's manual when he came upon a paragraph about the U-21 door. It stated that the door was an "air-stair" door which, when opened in flight, would streamline and float horizontally so that the crew could step on it to bail out in the event of an emergency. Being airborne qualified, CPT Curious told CPT Newby that he didn't believe that statement and intended to open the door to determine its validity.

CPT Newby was flying in the left seat and, feeling obligated to protect his AC, attempted to instruct CPT Curious that such a feat was a dangerous and witless deed. "I'm the AC," replied CPT Curious, "and I'm gonna do it!" Whereupon, he exited the right seat, moved to the rear of the cabin, unlatched the safety chain and opened the door. CPT Newby felt the aircraft shutter slightly and turned around in his seat to find the aircraft empty. The thought of explaining to the company commander how he lost his AC sent a horrifying chill through his corporeal frame. Furthermore, how was he going to land with the door open?

All of these thoughts petrified the now desperate CPT Newby when he noticed a hand appear at the right bottom corner of the door. For one fleeting moment, the idea of revenge for all the previous consternation of the deed flashed before CPT Newby. Up jumped the devil and said, "Use your rudder pedals and shake him off!" But the light side of the Force prevailed, and CPT Newby reduced power, lowered the flaps and gear and flew the aircraft at slow flight speed.

CPT Curious, who was no longer curious, managed to get his left leg into the aircraft and, by using the brute strength he had acquired during his airborne training, climbed back into the U-21, closed the door and crawled on his hands and knees back to the cockpit.

Silence was not golden as CPT Curious sat in the right seat pondering his exploration of the unknown. His right leg, which caught in the plastic wrapped cable used to lower the door from the inside, and left him dangling from 10,500 feet at 200 knots over the South China Sea, had been severely injured. "CPT Newby," he stammered, "we'll tell them at Long Than that the annunciator panel door light came on and I went back to check it. When I grabbed the door handle, the door came open and pulled me out." CPT Newby's loyalty overrode his good judgment and he agreed to the story. Upon returning to Long Than, and telling their incredible yarn, CPT Newby was proclaimed a hero for saving the life of his AC.

As CPT Newby looked at us, swallowed the last of his drink, and attempted to put aside his guilt, he concluded by saying, "I think CPT Curious needs psychiatric help." We consoled CPT Newby. Assured he'd done the right thing, he left to rest and fly another day. And what of CPT Curious? Oh, he's still curious, but not about the U-21 door. He was temporarily grounded, evaluated, and placed in copilot status until his curious nature could be controlled and until he demonstrated the mature professionalism required for all Army aviators.

The moral to this incident is simple—so simple, in fact, it need not be stated.

Enough said!

Major James L. Johnson
Chief, Flight Standardization and Training
Fifth U.S. Army

Post script—Thank God, the Army didn't purchase pressurized U-21s in 1966.

You can say No!

ALL TOO OFTEN, rather than say no, young and not so young aviators accept missions which are beyond their capabilities or the capabilities of their aircraft. From my own experience, I believe these wrong decisions are made many times because of peer and command pressure—actual or imagined—and overconfidence.

Sometimes we need to say no. For example, while I was in Vietnam 10 years ago, 14 people were killed and 6 seriously injured within a 7-day period on three separate missions. The first mishap involved a UH-1H flying at night. While flying on the beach side of the compound the aircraft entered IMC about 300 feet agl, became inverted, and crashed into the sea, killing four of the five individuals on board. The instrument meteorological conditions were forecast.

The second mishap involved another UH-1H on a routine medevac mission at 0400. The pickup zone was a 5-minute flight about 2 miles up a valley. The crew picked up three patients with minor injuries and then departed to the east. The pilot entered heavy rain showers after about 30 seconds of flight and flew into the northern wall of the valley. The three patients and three crewmembers were killed. The only survivor was the crew chief.

The third mishap occurred during

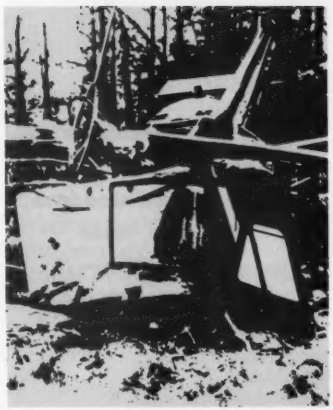
CW3 Russell C. Wingate

U.S. ARMY SAFETY CENTER

an emergency resupply mission. A typhoon was due to hit the area the next morning. Although the ground troops still had three days of supplies, they felt they needed more to weather the storm. The winds were between 30 and 40 knots when the resupply aircraft departed on the mission. The weather was worse in the mountains than expected or reported. Approximately 1 kilometer from the LZ, the aircraft entered instrument meteorological conditions and flew into a mountain. The aircraft burned on impact, killing three crewmembers and one passenger. Three passengers and one crewmember survived.

Two of these mishaps occurred at night and one occurred during daylight hours. However, all of them occurred while the weather was less than desirable. Two were on routine missions and one was on an "emergency resupply." I emphasize "emergency resupply" because it later came to light that the ground commander had more than enough supplies to last several days. Therefore, there was no real urgency. Each mission could have been delayed, postponed, or aborted, or an alternate means could have been used to complete the mission.

True, these mishaps happened 10 years ago. But since then I've seen an OH-58 and an AH-1 crash in instrument meteorological conditions while the crew was en route to a small town for a static display.



I've also seen two aircraft crash on an island above the 10,000-foot level. An AH-1 crashed first and only 1 hour later an OH-58 crashed at the same location. In both cases, the pilots either exceeded their own or their aircraft's capabilities.

Every year we continue to lose people and aircraft because of faulty aircrew judgment. Although pilots gather all of the available information concerning a given flight, some of them still make wrong decisions. We've all made wrong decisions and, hopefully, we have learned from our mistakes. Many of us have a considerable amount of experience in aviation, and some of us fly with less experienced pilots every day. While none of us have necessarily had the same experiences, we especially need to see that individuals with less experience learn from our mistakes. We must be open and honest with each other. When we are flying together, we need to talk to each other and tell the less experienced pilots why we do something a certain way, so that they can profit from our expertise.

It all boils down to one thing—professionalism. Take, for instance, one commander who told me he was a fatalist, while trying to get me to fly lower and lower in the mountains at night. And to top it off—I attended a safety awards ceremony one day and after General X handed out the awards for safe flying he proceeded to chew the aviators for getting bogged down with safety regulations. He equated us with the Air Force because we were falling back on our regulations and, in his opinion, turning down too many missions.

It is not always easy to say no, but we *are* supposed to be professionals. If we strive to be professional in all aspects of our career, we should have the respect of our peers and commanders. Because of this respect, they will accept our decisions when we say "no" to a mission which is beyond our limitations and those of our aircraft.

This article was written from a lesson plan prepared by the author while he was attending the Aviation Safety Officer Course. The views expressed in this article are those of the author and not necessarily those of the Department of the Army or the Army Safety Center.

Continued from page 5

larly vulnerable to air attack, local air superiority is highly desirable, and support in the form of counterair and ground-based HIMAD units must be coordinated between the maneuver commander and the region air defense commander. This is accomplished through the air defense officer supporting each respective maneuver headquarters and through the Air Force direct air support center collocated with the corps airspace management element. These supporting air defense elements must be integrated into the commander's plan of attack and scheme of maneuver and also into a comprehensive defense, guaranteeing coordination of effort and unity of action.

As a result, the air defense scheme of the division as a whole consists of a larger number of small, mobile ADA forces supporting maneuver elements, while a modicum of relatively larger sized defenses is retained around critical installations and combat service support areas. *Therefore ADA in the offense is generally deployed with Redeye (or Stinger) teams and Vulcan squads integrated into attacking combined arms company teams, with Chaparral platoons or batteries protecting assets such as battalion or brigade trains, critical command posts and supporting field artillery.* As the maneuver elements move forward, HIMAD batteries positioned in the divisional area should also relocate forward, with approval of the region air defense commander, to extend coverage for attacking forces and division and corps rear elements.

As the attack develops into an exploitation and subsequently a pursuit, maneuver forces become even more vulnerable to air attack as they penetrate the depths of the enemy's defenses and move beyond friendly HIMAD coverage. Since formations during these phases are extended and the limited ADA available must cover more area, the maneuver commander must recognize that air defense coverage cannot be as effective. So it is particularly important during an exploitation or pursuit that Air Force counterair operations support and establish local air superiority.

". . . as the attack develops, air defense coverage becomes less effective, thus forcing greater reliance on Air Force counterair support . . . ."

Offensive Maneuver Implications

To this point I have mentioned several implications for the maneuver commander concerning ADA use in the offense. These include greater numbers of maneuver assets being defended by smaller sized ADA elements, coordination requirements for counterair and HIMAD support, and the realization on the part of the maneuver commander that as the attack develops, air defense coverage becomes less effective, thus forcing greater reliance on Air Force counterair support.

Additionally, the maneuver implications discussed previously for defensive operations also apply to the offensive situation, although somewhat modified. The risks of signature detection and incidental maneuver damage to enemy suppression of air defenses, for instance, are reduced because we have the initiative and because of reduced unit size and more frequent unit movement. Conversely, the need for liaison and communication increases due to the extremely fluid nature of the offense and the increased requirements for coordination.

summary

Air defense impacts heavily on the maneuver commander and as such is a vital element of the combined arms team. It is essential that the ground commander establish his priorities so that the air defense commander can allocate his resources to provide the best possible air defense protection, thus allowing the division's maneuver elements to move with greater freedom on the battlefield so they can close and destroy the enemy.

Remember, the air defense of a maneuver unit is the responsibility of that maneuver unit commander. Although we air defenders assist him to accomplish this responsibility, each maneuver commander must not only learn air defense himself but must also train his subordinates in air defense.

TRADOC SYSTEMS MANAGERS (TSMs)

UNITED STATES Army Training and Doctrine Command (TRADOC) Systems Managers (TSMs) are catalysts in the acquisition system. They are managers that guide all *user* aspects of assigned system(s). It is their responsibility to organize, energize, integrate, expedite and ensure that the proper user office does its job with respect to assigned systems.

Normally, each TSM office is collocated with the proponent center/school. Although chartered formally by the commander, TRADOC, the TSM manager works directly for the center commander or school commandant.

The standard TSM office is staffed with:

- **One colonel**
- **One lieutenant colonel**
- **Two majors**
- **One secretary**

Aviation-related TSMs with their correct address and telephone numbers (AUTOVON and commercial) are listed below. (TSMs are located at the U.S. Army Aviation Center, Ft. Rucker, AL 36362, unless otherwise indicated.)

Utility Helicopters (Black Hawk and UH-1)
ATTN: ATZQ-TSM-U
COL Cornelius F. McGillicuddy Jr (TSM)
MAJ E. Gordon Jr
MAJ B. Genter
AUTOVON: 558-6642/7115/3505
COMMERCIAL: 205-255-6642/7115/3505

Helicopter Launched Fire and Forget Missile (HELLFIRE) and Multipurpose Lightweight Missile System (MLMS)
ATTN: ATZQ-TSM-H/MLM
COL Lee C. Smith Jr (TSM)
LTC Darryl Anderson
MAJ Mike Stacy
MAJ (P) Dave Lum
CW2 Charles Knupp
AUTOVON: 558-5905/6005
COMMERCIAL: 205-255-5905/6005

Attack Helicopters (AAH, AH-1 and LCH)
ATTN: ATZQ-TSM-A
COL David L. Funk (TSM)
LTC M. S. Glynn
MAJ (P) W. P. Leach
MAJ T. J. Roop
MAJ M. L. Brittingham
MAJ K. L. Landon
MAJ J. A. Mitteer
CPT M. K. Minich
AUTOVON: 558-5171/2108/3408
COMMERCIAL: 205-255-5171/2108/3408

Scout Helicopters (AHIP, OH-58, OH-6 and ASH)
ATTN: ATZQ-TSM-S
COL Robert S. Fairweather Jr (TSM)
LTC R. A. Neuwien Jr
MAJ E. G. Fossum II
MAJ T. E. Konkle
MAJ A. L. Pope
AUTOVON: 558-4909/3808/2872
COMMERCIAL: 205-255-4909/3808/2872

Position/Navigation Systems (POS/NAV)
U.S. Army Combined Arms Center
ATTN: ATZL-CAT-MP
Ft. Leavenworth, KS 66027
COL Roger J. Browne II (TSM)
MAJ D. J. Gagliano
AUTOVON: 552-2197
COMMERCIAL: 913-684-2197

Single Channel Ground and Airborne Radio Subsystem (SINCGARS)
U.S. Army Signal Center and Ft. Gordon
ATTN: ATZH-TSM-SG
Ft. Gordon, GA 30905
COL John W. Stillwell (TSM)
LTC A. R. Ruddle
MAJ J. R. Inman
CPT D. E. Hinton
AUTOVON: 780-2557/2057
COMMERCIAL: 404-791-2557/2057

Automatic Test Support Systems (ATSS)—Formerly Test Measurement and Diagnostic Systems (TMDS)
U.S. Army Signal Center and Ft. Gordon
ATTN: ATZH-SS
Ft. Gordon, GA 30905
COL Robert S. Snead (TSM)
CPT Anthony R. Strickler
1LT Terrence Kop
CW3 Siebren H. B. Visser
AUTOVON: 780-7477/3555
COMMERCIAL: 404-791-7477/3555

Special Electronic Mission Aircraft (SEMA) Systems
U.S. Army Intelligence Center and School
ATTN: ATSI-TSM-A
Ft. Huachuca, AZ 85613
COL Douglas A. Ruane (TSM)
LTC J. T. Baer
MAJ Patrick Tominey
CPT Robert L. Bohling
2LT David Carmichael
AUTOVON: 879-5579/5643
COMMERCIAL: 602-538-5579/5643

Standoff Target Acquisition System (SOTAS)
U.S. Army Intelligence Center and School
ATTN: ATSI-TSM-S
Ft. Huachuca, AZ 85613
COL Leonard G. Nowak (TSM)
LTC R. K. Rasmussen
MAJ I. Smith
CPT T. P. Neilon
AUTOVON: 879-5892/5398
COMMERCIAL: 602-538-5892/5398

PROGRAM/PROJECT

AVIATION-RELATED program/project managers plan, organize, direct and control approved programs. They are chartered formally by the Secretary of the Army and have full-line authority over assigned programs.

A program manager's office may be established by the materiel developer when the program is of such importance, complexity and magnitude to warrant employment of another centralized management structure.

Product managers are chartered by, staffed and supported from resources of the establishing materiel developer. These managers must possess an additional skill identifier of "6T" (Project Manager Develop-

DARCOM
U.S. Army Materiel Development and Readiness Command

Advanced Attack Helicopter (AAH)
ATTN: DRCPM-AAH
MG Edward M. Browne (PM)
AUTOVON: 693-1911/2
COMMERCIAL: 314-263-1911/2
Mr. William H. Brabson Jr (Deputy PM)
AUTOVON: 693-1913/4
COMMERCIAL: 314-263-1913/4
LTC Carl Propp (Chief, Field Office)
AUTOVON: 284-8939

Black Hawk
ATTN: DRCPM-BH
COL Ronald K. Andreson (PM)
AUTOVON: 693-1800/1
COMMERCIAL: 314-263-1800/1
Mr. Conrad L. Busse (Deputy PM)
AUTOVON: 693-1802/3
COMMERCIAL: 314-263-1802/3

Training Devices
Naval Training Center
ATTN: DRCPM-TND-PM
Orlando, FL 32813
AUTOVON: 791-5292
COMMERCIAL: 305-646-5292
COL Donald M. Campbell (PM)
Mr. William Marroletti (Deputy PM)

AVRADCOM
Aviation Research and Development Command

Advanced Scout Helicopter (ASH)
ATTN: DRCPM-ASH
AUTOVON: 693-1360
COMMERCIAL: 314-263-1360
COL Ivar W. Rundgren Jr (PM)
Mr. James F. Matthews (Deputy PM)

Aircraft Survivability Equipment (ASE)
ATTN: DRCPM-ASE
AUTOVON: 693-1460
COMMERCIAL: 314-263-1460
COL Edward C. Robinson (PM)
Mr. Gary L. Smith (Deputy PM)

CH-47 Modernization Program
ATTN: DRCPM-CH-47M
AUTOVON: 693-1411
COMMERCIAL: 314-263-1411
COL Dewitt T. Irby Jr (PM)
Mr. John P. Clarke (Deputy PM)

MICOM
Missile Command

HELLFIRE/Ground Laser Designators
ATTN: DRCPM-HD
Redstone Arsenal, AL 35898
AUTOVON: 746-1365
COMMERCIAL: 205-876-1365
COL Stanley D. Cass (PM)
Mr. John J. Harrity Jr (Deputy PM)

TSMs and PMs compiled by Helen McCollough

PRODUCT MANAGERS

ment Program) in addition to specialty codes. As an internal management and control device, materiel developers may, within existing resources, designate other programs for management by the techniques outlined in AR 70-17 when:

- **Interfaces involved are primarily within their areas of responsibility.**
- **Development, acquisition or materiel readiness programs have not been designated by the Secretary of the Army in accordance with AR 70-17.**

Aviation-related managers (with correct address and telephone number) are listed below. (The address for each command is 4300 Goodfellow Blvd, St. Louis, MO 63120, unless otherwise indicated.)

CECOM
Communications-Electronics Command

Position Location Reporting System/Tactical Information Distribution Systems (PLRS/TIDS)
ATTN: DRCPM-PL
Ft. Monmouth, NJ 07703
AUTOVON: 992-4251/2
COMMERCIAL: 201-532-4251/2
Mr. Harold Bahr (Acting and Deputy PM)

Single Channel Ground and Airborne Radio Subsystem (SINCGARS)
ATTN: DRCPM-GARS
Ft. Monmouth, NJ 07703
LTC (P) Edward R. Baldwin (PM)
AUTOVON: 995-4141
COMMERCIAL: 201-544-4141
Mr. George J. Woods (Deputy PM)
AUTOVON: 995-4142
COMMERCIAL: 201-544-4142

Test Measurement and Diagnostic System (TMDS)
ATTN: DRCPM-TMDS
Ft. Monmouth, NJ 07703
LTC Joseph C. Marangola (PM)
AUTOVON: 992-1759/2361
COMMERCIAL: 201-532-1759
Mr. John C. Perrapato (Deputy PM)
AUTOVON: 992-1759/2361
COMMERCIAL: 201-532-2361

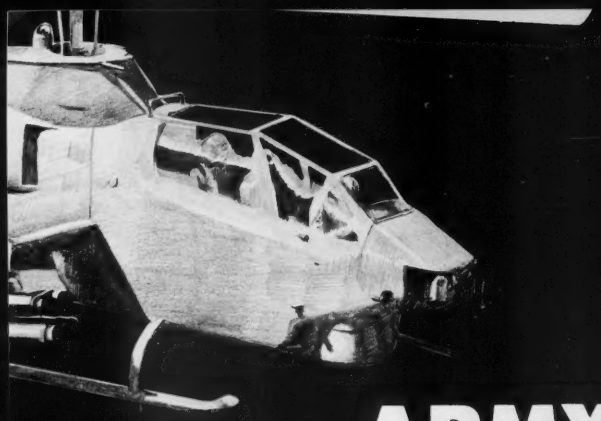
TSARCOM
Troop Support and Aviation Materiel Readiness Command

Cobra
ATTN: DRCPM-CO
AUTOVON: 693-3306
COMMERCIAL: 314-263-3306
COL Donald R. Williamson (PM)
Mr. Marlyn K. Buffington (Deputy PM)

Special Electronic Mission Aircraft (SEMA)
ATTN: DRCPM-AE
AUTOVON: 693-3190
COMMERCIAL: 314-263-3190
COL Sylvester C. Berdux Jr (PM)
Mr. Jaros Rickmeyer (Deputy PM)

ERADCOM
Electronics Research and Development Command

Standoff Target Acquisition System (SOTAS)
ATTN: DRCPM-STA
Ft. Monmouth, NJ 07703
AUTOVON: 996-5165
COMMERCIAL: 201-544-5165
COL William R. Crawford (PM)
Mr. William J. Kenneally (Deputy PM)



ARMY AVIATION'S MUSEUM...

Betty J. Goodson
Staff Writer

THE AIR FORCE Thunderbirds and the Army's Golden Knights know that a new building is needed for the Army Aviation Museum at Ft. Rucker, AL—as do the thousands of people who attended the first Alabama Air Fair sponsored 6 and 7 June by the Dothan/Houston County Chamber of Commerce. In addition to the showy jets and parachutes, there were six civilian aerobatic acts which riveted the audience's attention for the 4-hour show held at the Dothan Airport near Ft. Rucker.

A decision to hold the air fair as Dothan's contribution to a new home for the museum's contents resulted in a year's work for chamber members. Why would a civilian group put forth so much effort to stage an event for the benefit of a military installation?

Dr. Fred Garrett, chairman of the Alabama Air Fair, answered: "We decided on an airshow because there is not a major one in this area, and we wanted to give those attending something they would enjoy as well as an opportunity to help the museum. We would like for this to become an annual affair with the profits going as long as needed to the museum building fund because we all recognize the importance of Army Aviation and particularly Ft. Rucker and what it does for our area."

Gratitude for the Dothan/Houston County Chamber of Commerce effort was expressed by Colonel F. M. McCullar (Ret.), executive committee chairman of the Army Aviation Museum Foundation, Inc.: "The museum is the sole repository for a number of aircraft that are one of a kind. We feel those and the many other items in the museum are worth preserving; and we can do that only through the erection of a properly air-conditioned, fire-resistant building. That takes money, and the foundation is indebted to the good people of Dothan for the organization and production of this air fair. We are deeply grateful."

The point made by Colonel McCullar about the fire resistance is one reason there is a non-profit organization like the foundation working around-the-clock and in all areas of the world to gather money to construct adequate housing for the artifacts, documents and other items which record the history of Army Aviation. They are now housed in wooden World War II buildings that have no fire suppression equipment, sprinkler systems or even smoke detectors. Further, there are no humidity controls, resulting in an ongoing deterioration to the items. Beyond the threat of fire and humidity is the damage caused by the sun and rain to the aircraft which have to be parked outside due to insufficient indoor space.

Dothan residents, as Dr. Garrett said, appreciate the museum's importance and the necessity of preserving the exhibits, just as have those from Ft. Rucker's other neighboring towns, Ozark and Enterprise. To date, Enterprise has contributed more than $44,000 and Ozark more than $37,000. Part of that importance relates to the entire state of Alabama, since the Army Aviation Museum, with a yearly average of 300,000 visitors, ranks as its seventh largest tourist attraction and is the only one in the top 10 that does not charge an admission fee. Because of that, the Alabama Legislature in 1980 appropriated $75,000 for the building fund.

THANKS . . . Dr. Fred Garrett, Dick Bell and John M. Norton (from left) are three members of the Dothan/Houston County Chamber of Commerce who expended a year's work to stage the Alabama Air Fair at Dothan, AL, to benefit the building fund of the Army Aviation Museum, Ft. Rucker, AL. Colonel F. M. McCullar (Ret.), right, executive committee chairman, Army Aviation Museum Foundation, Inc., tells them how much the chamber's efforts are appreciated

photo by SP4 Denise Starr

Several industries, primarily aerospace firms, also have made generous contributions.

The foregoing, together with gifts and pledges from many individuals and organizations, have to date raised approximately $300,000 toward the $2 million required and which must be in hand before the ground can even be broken for the museum structure.

That's where YOU come in!

Army Aviation men and women, both on active duty and in Reserve components, need to be awakened to the fact that the museum and its contents are part of their heritage. Those contents are valued today at $70 million—and for a person to have such an estate and neglect it is foolish.

That "estate" includes 101 aircraft. Numbered among them are the Sikorsky VCH-34 Choctaw which was the first Presidential flight detachment helicopter and was used by President Dwight D. Eisenhower; the Bataan, General Douglas MacArthur's personal Lockheed C-121A Constellation; a Piper L-4 Cub, the same type that flew off the deck of the aircraft carrier *USS Ranger* in World War II; a McDonnell XV-1 Compound, believed to be the only aircraft which carries the separate designations of a helicopter, fixed wing and vertical takeoff; a Russian Mi-4 Hound helicopter which resembles the Sikorsky UH-19 Chickasaw (there's also one of those at the museum), probably because the Hound's inventor and Igor Sikorsky were fellow students at the same Russian aeronautical college; and a Bell AH-1G Cobra that was the second of the gunships off the Bell production line. While it is not counted in the 101, there is a model of the Wright brothers airplane tested at Ft. Myer, VA, and purchased in August 1909 as "U.S. Army Aeroplane No. 1."

Other vital parts of the estate which belongs to today's Army Aviation personnel are: the Army Aviation Hall of Fame, sponsored by the Army Aviation Association of America; a memorial room which contains brass plates inscribed with the names of Army Aviation personnel who were killed in Southeast Asia; a reference library with documents and material relating to the history of military aviation; aviation uniforms from World War II through the present; and display cases containing memorabilia from Europe, Korea and Vietnam.

There is also a gift shop in the museum which is operated by the foundation, and its profits go to the building fund.

The proposed home for the Army Aviation Museum is to be 600 feet long and 100 feet wide. In addition to the display areas, it will include offices, a theater, conference rooms and repair shops. Most importantly, perhaps, it will be properly equipped to prevent and/or suppress fires and to control the environment.

Its location at Ft. Rucker will be at the intersection of Headquarters Road and Andrews Avenue, a site that has been called "the best real estate on post." Now used as a parking lot, that location is in front of the present museum, meaning there will not be so much time or expense involved to move the contents to the new building.

proposed building
U.S. ARMY AVIATION MUSEUM
FT. RUCKER, ALABAMA

Anticipated date of completion is 1986, and then ownership will be turned over to the Department of the Army for maintenance and operation.

How can YOU help?

Tax-deductible contributions can be made to the Army Aviation Museum Foundation, Inc., P.O. Box H, Ft. Rucker, AL 36362. Pledges to be paid over a 4-year period are welcomed. Individuals who contribute $100 or more and organizations whose gifts are more than $500 will be listed on a plaque in the new museum. Memorial opportunities are also available.

The Army Aviation Museum belongs to YOU to enjoy and use today, and it is too valuable an estate to be neglected. Also, those who will serve Army Aviation tomorrow are counting on YOU to preserve it for them!

...NEEDS A NEW HOME

AVIATION PERSONNEL NOTES

Career Management Field 67 Update

Lieutenant Colonel Richard L. Naughton
Chief, Transportation/Aviation/Maintenance Branch
U.S. Army Military Personnel Center

DEPARTMENT OF THE ARMY has approved a plan which will substantially modify the existing Career Management Field (CMF) 67 (Aviation Maintenance). The plan was based on a Deputy Chief of Staff for Logistics (DCSLOG) sponsored study group recommendation which was coordinated with all major Army commands. A few of the reasons which prompted a revision of CMF 67 are: (1) increased aviation equipment complexity, (2) unsatisfactory first-term reenlistment rate for aviation maintenance personnel, (3) inappropriate grade authorizations, and (4) an ineffective military occupational specialty (MOS) structure. As your enlisted branch chief, I will limit the substance of this article to addressing MOS structure deficiencies, which include but are not limited to:

- Lack of discrimination between fixed wing maintenance skills.
- Lack of identification of specific aircraft quality control skills.
- Supervisory span of control in the aircraft component repair and aircraft maintenance subfields.

Now let's get to some of the specifics. MOS 67W (Aircraft Quality Control Supervisor) will be eliminated. Instead, an MOS 66 series will be created which will identify Soldiers "functionally" as technical inspectors (TI) with specific aircraft. The new 66 series will include: MOS 66G (Utility/Cargo Airplane TI), MOS 66H (Observation Airplane TI), MOS 66N (Utility Helicopter TI), MOS 66T (Tactical Transport Helicopter TI), MOS 66Y (Attack Helicopter TI), MOS 66V (Observation/Scout Helicopter TI), MOS 66X (Heavy Lift Helicopter TI), and MOS 66U (Medium Helicopter TI). On the fixed wing side MOS 67G will be split into MOS 67G and MOS 67H to identify Utility/Cargo and Observation Helicopter Repairers, respectively. MOS 67G, 67H, 66G and 66H will merge at 67G (E7) and progress to 67Z (E8).

Similarly there will be some revision to the rotary wing structure. MOS 67N, 66N, 67T and 66T at grade E6 will all merge to 67N at grade E7 and then progress to 67Z (E8). Also, the attack and observation/scout MOS (67Y, 66Y, 67V, 66V) will merge at grade E7 (67Y) and then progress to 67Z (E8). The medium/heavy lift MOS (67U, 66U, 67X, 66X) will merge at grade E7 (67U) and then progress to 67Z (E8).

Let's take a look at the aircraft component repair revision. Aircraft Fire Control Systems Repairer (MOS 68J) and the Aircraft Weapons System Repairer (MOS 68M) will merge at grade E6 (MOS 68J), progress to E7 (MOS 68J) and then to MOS 67Z (E8). Aircraft Electrician (MOS 68F) and Aircraft Pneudraulics Repairer (68H) will remain the same, structurewise. The Aircraft Power Plant Repairer (MOS 68B), Aircraft Power Train Repairer (MOS 68D) and Aircraft Structural Repairer (MOS 68G) will now all merge at grade E6 (MOS 68K). Progression will be from MOS 68K (E6) to MOS 68K (E7) and then to MOS 67Z (E8).

The new structure will more closely distribute aviation maintenance personnel along functional lines and allow for a more orderly career progression. Reclassification procedures (how?, when?) have not been finalized nor have other personnel regulations that will make this revision work to the betterment of the enlisted force and the Army. In future articles I will keep you, the enlisted aviation force, up-to-date on the progress of the CMF 67 revision.

ASED/TFOS MISMATCH = NO PAY DUE

Major Michael Jennings
Aviation Plans/Programs Branch
U.S. Army Military Personnel Center

The importance of current/correct Officer Record Briefs (ORBs) is constantly stressed to Army officers. While it is generally accepted that an erroneous ORB could adversely affect chances for promotion, school selection or assignment considerations, specific errors on the ORB, the Officer Master File (OMF) or the Leave and Earnings Statement (LES) of an aviator can cause economic inconvenience if not actual hardships.

Figure 1, a reproduction of the LES, has two pertinent dates for aviators. If the ASED and the TFOS

FIGURE 1. Leave and Earnings Statement

do not coincide with the LES and the ORB, you will encounter a pay problem. The TFOS date on the LES is the date which the US Army Finance and Accounting Center will base their computation for entitlement to Aviation Career Incentive Pay (ACIP) after 18 years of *Total Federal Officer Service.* The ASED on the LES is the basis for amount of ACIP up to the 18 year TFOS point.

Figure 2 highlights certain areas on the ORB that the aviator should closely monitor.

An aviator noting a discrepancy in either of these vital documents should immediately report the error to his local Military Personnel Office.

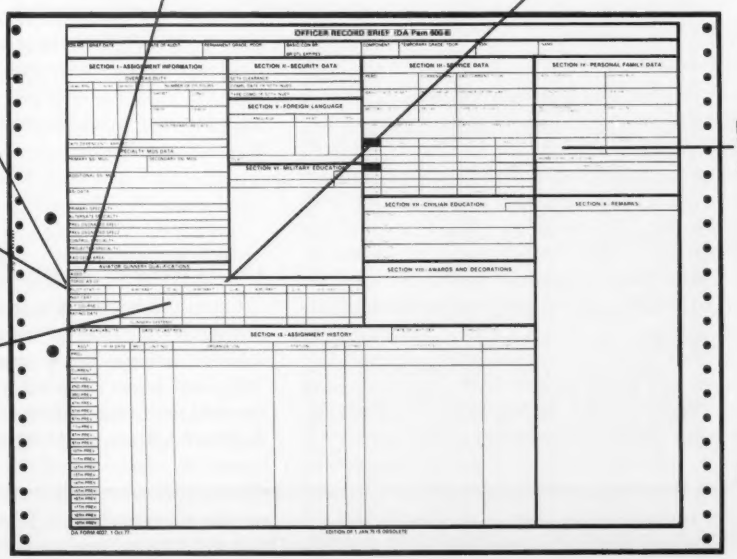
TOFDC (Total Operational Flying Duty Credit). The cumulative number of months an aviator is assigned to operational (not proficiency or non-operational) flying duty positions.

ASED (Aviation Service Entry Date). The date an officer is first qualified, i.e., on valid orders, for aviation service. Once established, ASED is not normally changed.

TFOS (Total Federal Officer Service). All officer service computed from date of original appointment as a warrant or commissioned officer.

Pilot Status Code
1=Qualified for Aviation Service
2=Medically Disqualified
3=Non-Medically Disqualified
4=Aviator—Not In Aviation Service

Aircraft Qualification Code
1=Qualified Aviator
2=Unit Trained Instructor Pilot
3=School Trained Instructor Pilot
4=School Trained Maintenance Test Pilot
5=School Trained Maintenance Test Pilot/School Trained Instructor Pilot


OFFICER RECORD BRIEF (DA Form 605-E)
SECTION I - ASSIGNMENT INFORMATION
SECTION II - SECURITY DATA
SECTION III - SERVICE DATA
SECTION IV - PERSONAL FAMILY DATA
SECTION V - FOREIGN LANGUAGE
SECTION VI - MILITARY EDUCATION
SECTION VII - CIVILIAN EDUCATION
SECTION VIII - AWARDS AND DECORATIONS
SECTION IX - REMARKS
SECTION X - ASSIGNMENT HISTORY

Date of Physical. This date should change annually.

FIGURE 2. Officer Record Brief

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Karen Davis photographed by Reid Rogers

TO For Headset

In the Question and Answer section of the March 1981 PEARL, we responded to a question concerning the availability of a reference for the H-157/AIC headset-microphone. At that time, we were unaware of any Army technical manual (TM) or Air Force technical order (TO) suitable for use as a reference when maintaining this item of equipment. However, we have since been enlightened to the fact that Air Force TO 12R2-2AIC-222 (technical manual, headset-microphone type H-157/AIC) serves just that very purpose. This publication is dated 15 June 1963 and has one change dated 16 Feb 1968. (Thanks to Jim Dittmer, Directorate for Maintenance, TSARCOM, for this info.)

$E=1/2MV^2$

For those of you who are a little rusty at your formulas, $E=1/2MV^2$ means energy equals one-half the mass times the velocity squared, or in other words, a couple of pounds of feathers can tear heck out of an airplane.

Tests have determined that a 3-pound bird, hitting your windscreen at 420 knots has about 23,000 pounds of kinetic energy to dissipate. Of course, most Army aircraft do not fly this fast, but the slower you fly in a known bird or migratory fowl route, the better. Bird strikes are more probable at lower altitudes.

If birds are reported to be around the airport you intend to use, fly a straight-in approach if you are able. Experiments have proven that birds can see and hear well, and they rely on these senses to warn of danger. Evidence also exists, however, that birds cannot predict an airplane's flightpath if it is not in a straight line. Turn early to avoid birds, if able. Last ditch maneuvers usually don't work.

$E=1/2MV^2$ also could mean to always fly with your SPH-4 flight helmet visor down. The visor is designed to save your eyes. Believe me, if you are trying to duck a goose, you won't have time to reach up and lower your visor. (Reprinted from PEARL, November 1978)

Use Of Water Purification Tablets

Questions have arisen from the field regarding the proper procedures for using the water purification tablets, national stock number (NSN) 6850-00-985-7166, which are included in Army survival kits and survival vests. According to the U.S. Army Medical Materiel Agency, Ft. Detrick, MD, you should follow

If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120 or call AUTOVON 693-3307 or Commercial 314-263-3307

the following steps when purifying drinking water:

- Add one tablet to a quart canteen of clear water—two tablets if cloudy or very cold water.
- Replace canteen cap loosely. Wait 5 minutes and shake well, allowing leakage.
- Tighten cap. Wait an additional 20 minutes before using for any purpose.

The most recent change in these procedures involves the use of two of the 8 mg iodine tablets when purifying very cold water, since it was found that one tablet was insufficient to kill certain bacteria present in this water.

New Address For Manufacturer

In several past issues of PEARL we have given you the address of Lifesaver Industries, the manufacturer of the butane lighter, fire starter, NSN 9920-00-999-6753, a component of the SRU-21/P survival vest. This company has moved and the new address and phone number are listed below. Note that Lifesaver Industries *no longer makes* the fire starter; however, they do stock the refill kits for that item.

Lifesaver Industries
1512 11th Street
Suite 205
Santa Monica, CA 90401
(213) 393-0754

Questions And Answers

My question concerns the one-piece Nomex flight suits. I recently received mine from our CIF and have the same problem with them that I had when I was first issued the two-piece suits. The standard sizes don't fit me properly; specifically, the sleeves are too short. At Ft. Rucker, I had two-piece Nomex shirts custom made for me. What I need to know is if it's also possible to get custom made one-piece flight suits? Who would be my point of contact in Germany? Also, on the one-piece suit, is the small, thin, snap pocket on the left leg in fact a knife pocket? Finally, regarding the two-piece trousers, the little pocket on the inside of the knife pocket was great for storing a signal/emergency panel. Is there any plan to incorporate a pocket like this on the one-piece suit. (1LT James P. Neely, Co D, 501st Aviation Battalion, APO NY)

We forwarded your questions to the folks at Natick Laboratories, since they are the real experts when it comes to clothing. Their response was as follows:

The size system for the one-piece Nomex flight suit has been designed to accommodate the 5th through the 95th percentile of the population, including females, in all the military services. There are 29 sizes offered—sizes 32 up to size 48 in 2-inch increments—and 4 lengths—X-Short, Short, Regular and Long. If you cannot be properly fitted within the standard range of sizes or by authorized alterations, it is recommended that you contact the manager of the clothing sales store in your area. If he agrees that you cannot be properly fitted he will fill out a DD Form 358 (Special Measurement Blank—Clothing for Men) and forward it to the Installation Supply Officer who in turn requisitions the coveralls through the Directorate of Manufacturing, Defense Personnel Support Center, Philadelphia, PA.

In regard to the small pocket on the inside of the left leg of the coverall, it is a knife pocket. At the present time, there are no plans to include a smaller pocket inside the knife pocket to accommodate a signal/emergency panel. The present knife pocket has the capacity to accommodate both items.

TRADOC Slates ALSE Class:

An Aviation Life Support Equipment (ALSE) Maintenance Training Course is scheduled to begin 5 January 1982. Specific information concerning applying, location and course quota will be forthcoming in a TRADOC message within the next month.

Directorate of Evaluation/Standardization

REPORT TO THE FIELD

U.S. ARMY AVIATION STANDARDIZATION

WE GET LETTERS

We get phone calls too. It seems as though everyone in the aviation community has a friend at the Directorate of Evaluation/Standardization (DES), or at least a phone number, and we are continually asked for interpretations of Army Regulation (AR) 95-1. No problem. That's part of our job; however, it might be helpful to let your local standardization board have a crack at it first. Also, remember that the proponent for the aircrew training manuals (ATMs) is the Directorate of Training Developments, not DES. If you have a question regarding either AR 95-1 or the ATMs, it is advisable to submit it in writing to the appropriate agency, rather than calling. A written request allows the responder time to give the question a thorough examination and to send it to other agencies, if necessary, in order to provide the most accurate answer possible. What follows are a few questions recently received and the advice given.

Q: *If I fly from point A to point B and must remain on the ground with the aircraft running for 30 minutes, do I log all that as flight time?*

A: Yes you do, according to paragraph 3-18, AR 95-1. The new AR 95-1 says all the time will be logged, starting when an airplane begins to move forward on the takeoff roll or when a helicopter lifts off the ground, until the engines are stopped or the crew changes. Keep in mind, however, that the cost of fuel and repair parts keeps getting higher and higher. Try to avoid long ground run times whenever possible.

Q: *May nonaviator personnel motor the engines of helicopters?*

A: There appears to be no reason why enlisted maintenance personnel cannot *motor* helicopter engines provided a highly selective screening process is used to designate these individuals. Commanders should establish an appropriate training program, require periodic "evaluations" and designate qualified individuals in writing.

Q: *Who can log civilian flight time and what hours or tasks may be credited toward meeting ATM requirements? (Paragraph 2-6, AR 95-1)*

A: Active duty aviators should not log civilian flight time. This paragraph is intended solely for the Reserve Component (RC) aviator. Exactly what tasks may be credited is left to the discretion of the commander. Let's look at two examples:

- Paul Pilot is assigned to an RC unit and flies CH-54 Tarhes there. During the week he works for a logging company and flies CH-54s for them. Many of his ATM tasks will be accomplished during the week.
- Alfred Aviator is assigned to an RC unit and flies OV-1 Mohawks there. During the week he flies a 727 between Atlanta and New York. Although the 727 is a larger aircraft, Alfred is not doing many things which would have a positive transfer to the Mohawk.

Admittedly, these are two extreme examples. The commander must evaluate the circumstances of each aviator to whom this paragraph might apply and determine exactly which tasks, if any, should be credited toward ATM requirements.

Q: *The UH-1V Huey differs from the UH-1H only in having a radar altimeter, but the ATM says I have to get at least 1 hour of flight instruction by an instructor pilot or standardization instructor pilot (SIP) in addition to academic instruction. Isn't that a waste of flight time?*

A: Yes it is. Our message, 191330Z Jan 81, deletes the 1-hour flight requirement for transitions from the UH-1D/H to the UH-1V, requiring only academic instruction sufficient to ensure familiarity with the

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hot Line, AUTOVON 558-6487 or 205-255-6487 and leave a message

operation of the radar altimeter and associated components.

Q: *Chapter 4 of AR 95-1 requires me to have an operational fuel gauge for all flights. What if the gauge is fluctuating or the 20-minute fuel warning system is malfunctioning?*

A: The reason a fuel gauge is required is to help keep you from running out of fuel. If the gauge is fluctuating so badly you can't perform an accurate fuel consumption check, the gauge is not considered operational. The 20-minute fuel warning system is not a fuel gauge and operating your aircraft with the system malfunctioning would not be a violation of AR 95-1.

Q: *Should flight records be closed when aviators go on temporary duty (TDY) and will be flying while TDY?*

A: In most cases, no. If they are taking an aircraft for a week or two, the 759-1 work sheet can be filled out when they return. If they are going to be flying aircraft belonging to their host unit, they can bring back true copies of the 2408-12s. If it appears that some difficulty may arise, e.g., an aviator will be TDY at the end of his or her birth month, you should coordinate with that person's unit.

Q: *Table 7-3 of AR 95-1 says that the second copy of the 759 and 759-1 will be forwarded to the DA Career Control Branch, but the only address shown is for Medical Department personnel. Where do I send the others?*

A: That depends on the aviator's specialty:

If the specialty is:	The ATTN line is:
15	DAPC-OPE-V
71	DAPC-OPG-T
WO	DAPC-OPW

Q: *Item 6 in Table 7-1, AR 95-1, tells me that after adding all the columns on the DA Form 759-1, the totals of columns e through i should equal the totals of columns c and d, etc. What if, through rounding off the numbers, the totals don't agree?*

A: Adjust the total of column e, Day VFR. The same thing applies to copilot time; adjust the Day VFR column. This will be incorporated in a future change to AR 95-1.

We hope this information has been helpful. As was mentioned at the beginning of this article, one of DES's functions is providing interpretations of AR 95-1, and we welcome your questions; however, don't forget your local standardization board. If you come directly to DES, you will get an answer to your question, but you may be the only person in your unit with that information. By asking your SIP and the standardization board, you are making the system work as it is supposed to and ensuring the information is given widest distribution.

How Can I Get The . . .

UNITED STATES ARMY
AVIATION DIGEST

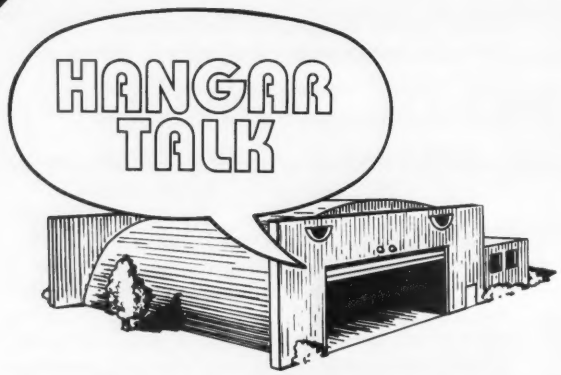
The ***U.S. Army Aviation Digest*** is an official Department of the Army publication.

Official distribution is handled by The Adjutant General. Active Army, National Guard and Army Reserve units under pinpoint distribution should request both initial issue and revisions to accounts by submitting DA Form 12-5. Detailed instructions for preparing 12-5 can be found on the back of the form. Submit the completed 12-5 to:

Commander
USA AG Publications Center
2800 Eastern Boulevard
Baltimore, MD 21220

National Guard units not on pinpoint distribution should submit their request through their state adjutant general.

MONTHLY WRITING AWARD



"Hangar Talk" is a quiz containing questions based on publications applicable to Army Aviation. The answers are at the bottom of the page. If you did not do well, perhaps you should get out the publication and look it over.

The FLIP and Aeronautical Charts

CW2 Gary R. Weiland
Directorate of Training Developments
U.S. Army Aviation Center
Fort Rucker, AL

1. "Void Time" is a mandatory entry on the DD Form 175 (Military Flight Plan) for what type of flights?

A. All IFR flights
B. All IFR and VFR flights outside the local flying area
C. Only stopover and/or en route delay flights

2. If you list 90 knots as your estimated TAS on your flight plan, a change to what in-flight TAS will require a report to ATC or FSS without request?

A. 80 knots
B. 94.5 knots
C. 96 knots

3. What does a flashing red light signal from the tower indicate to an aircraft on the ground?

A. Stop
B. Taxi clear of landing area (runway) in use
C. Return to starting point on airport
D. Exercise extreme caution

4. What does an underlined NAVAID frequency indicate on an en route chart or approach plate?

A. Operates less than continuous or on request
B. Usable range of 12,000 feet to 25 NM
C. No voice transmitted on this frequency

5. What is indicated by the "(1210)" on this sectional aeronautical chart obstruction symbol?

A. Height above ground
B. MSL elevation of base of obstruction
C. Obstruction identification number

6. Terminal radar programs provide what basic radar services to VFR aircraft?

A. None
B. Traffic information and limited vectoring (workload permitting)
C. Traffic information, vectoring and sequencing on a full-time basis
D. Same as "C" above, plus separation between all participating aircraft

7. Where can an aviator find a listing of VOR airborne checkpoints?

A. DOD FLIP, General Planning
B. DOD FLIP, Area Planning Documents
C. IFR Supplement

8. What VHF frequency should an aviator use to contact en route flight advisory service (flight watch)?

A. 122.0
B. 121.5
C. 123.6

9. Who is responsible for entering a time in the "Request Clearance After" block on DD Form 175?

A. Base operations personnel
B. Pilot in command
C. Clearance authority

10. A VASI is aligned to provide a visual glide slope of how many degrees from the horizontal?

A. 2.5 to 3
B. 3 to 5
C. 5 to 8

ANSWERS

1. C. DOD FLIP, GP para 4-2, item 19C
2. A. DOD FLIP, GP para 5-21a(1) (i)
3. B. DOD FLIP, IFR Supplement, page E6
4. C. DOD FLIP, En Route Charts and Instrument Approach Charts
5. A. Sectional Aeronautical Chart (Legend)
6. B. DOD FLIP, GP para 5-35a(1)
7. B. DOD FLIP, GP para 5-51d
8. A. DOD FLIP, IFR Supplement, page D4
9. A. DOD FLIP, GP para 4-2, item (26)
10. A. DOD FLIP, GP para 5-47b

HIND armament

What are the Facts?

HIND-D
Chin Turret
Armament

Donald L. Madill
Analyst, Threats Office
Combined Arms Combat Development Activity
Fort Leavenworth, KS

THE Mi-24 HIND-D, as shown in the above photo, mounts a 12.7 millimeter (mm) four-barrel Gatling-type machinegun in its chin turret. There are no photos and no confirmed evidence for reports that this armament may be replaced by 23 mm or even 30 mm guns on some HINDs. Such reports appear to be based on erroneous assessments of early photos, on conjecture or on mirror-imaging, and have led to considerable confusion regarding the type of gun in the HIND-D turret.

The earliest open literature report (the variant which was to become known as HIND-D) seems to have

THREAT

In stark contrast to well publicized U.S. weapons systems, Soviet weapons capabilities are shrouded in a veil of secrecy. The Soviet Mi-24 HIND-D helicopter, which has been operating with Group Soviet Forces Germany for years, is a perfect example. A major controversy still exists regarding the size and type of gun mounted in the chin turret of the HIND-D. Speculation by numerous intelligence sources has indicated that the gun ranges from a 12.7 mm up to 30 mm. Finished intelligence, however, is not based on speculation but cold, hard facts. So let's take a good look at HIND armament: What are the facts?

been published by ***Aviation Week & Space Technology*** (1 March 1976, p. 16): "Soviets have flown a new attack helicopter, with a different rotor system, tandem gunner/pilot seating and a radar-directed 23 mm gun in a chin-mounted turret." No photo of the new variant accompanied this report.

The first published photo of this "possible HIND variant" appeared in the Soviet military newspaper ***Red Star*** (11 March 1976) and was reprinted in ***Air Defense*** (October-December 1976, p. 43). The photo was of such poor quality that the "23 mm" story was not disputed.

However, by March 1977, in TC 1-88, "Aviator's Recognition Manual," the U.S. Army Aviation Center at Ft. Rucker, AL, was able to publish a clear photo of the HIND-D chin turret (similar to the photo on p. 35) stating correctly (p. 21.2): "The HIND-D, as seen in these photographs, incorporates a turret which houses a four-barrel 'Vulcan' type 12.7 mm gun." But, although the gun pictured is clearly 12.7 mm, the authors added, in deference to the earlier, unsubstantiated reports: "This turret can also accommodate a 23 mm cannon." Other sources, such as Wiener, ***The Warsaw Pact Armies*** (1977, p. 380) began to report a "four-barrel 12.7 mm Gatling gun," but the "23 mm" seed was sown and refused to die.

Thus, articles on the HIND-D through the years have continued to represent the two "schools of thought" on the gun, with about half choosing the 23 mm supposition over the 12.7 mm facts. The ***AW & ST*** report of "a radar-directed 23 mm gun" has been repeated in such periodicals as ***Aviation Digest*** (April 1977, p. 3 and May 1978, p. 2) and ***Army*** (December 1977, p. 29), with no reference to the 12.7 mm weapon confirmed in available photographs, and in ***Armor*** (March-April 1977, p. 41) as an alternative to the 12.7 mm gun. The correct assessment of the 12.7 mm, meanwhile, was accepted by the authors of articles in ***Armor*** (March-April 1977, p. 41), ***Flight International*** (6 August 1977, p. 418), ***Aviation Digest*** (December 1979, p. 43), and ***Jane's Defense Review*** (No. 2/80, p. 119).

The usually authoritative ***Jane's All the World's Aircraft*** (from the first mention of the HIND-D in ***Jane's*** supplement in ***Air Force***, June 1977, p. 42 to the entry in the regular 1979/80 edition, p. 202) has consistently straddled the two lines of assessment by ambiguously reporting "a four-barrel Gatling-type large-calibre machinegun." Although one might assume that "large-calibre" is intended to agree with the 23 mm school, it is important to note that ***Jane's*** also refers to the single-barrel, swivel-mounted machinegun of the HIND-A (labeled as a "12.7 mm machinegun" in ***Jane's*** editions through 1975-76) as a "large-calibre machinegun" starting in 1977.

Rather than skirting the issue, some publications attempted to reconcile the two types of armament reported. Early on, ***Armor*** (March-April 1977, p. 41) followed the lead of TC 1-88 in stating: "It is obvious that some type of Gatling gun has replaced the single-barreled machinegun. The Gatling gun is probably a four-barrel, 12.7 mm gun. The Soviets may elect to equip this helicopter with a 23 mm cannon in lieu of the Gatling gun." This made the 23 mm gun an option which might conceivably be used on some as yet unseen and unphotographed version of the HIND.

Despite the evidence of a 12.7 mm weapon, the two assessments were again mixed, but with a different accent, by Turbiville in ***Army*** (December 1977, p. 29): "This latest model has a modified nose turret which mounts a probable radar-directed multibarreled automatic weapon of unknown caliber. (The Soviet Union has at least two models of multibarreled 23 mm cannon designed for use on aircraft, although it would be premature at this point to suggest that one of them has been incorporated into the Mi-24)." Nevertheless, Turbiville himself makes this "premature" suggestion on the very next page by following the ***AW & ST*** lead: "Armament is said to consist of a nose-mounted 23 mm radar-directed gun." Thus, Turbiville planted yet another seed by suggesting that the HIND-D armament might be something like the twin-barrel 23 mm GSh-23 gun carried on Soviet fighter aircraft such as MiG-21, MiG-23 and Su-24. (The six-barrel 23 mm Gatling-type gun of the MiG-27 is a less likely candidate, and no aircraft is known to have a four-barrel Gatling gun.)

More recently, the "23 mm" seeds have begun to bear some strange "hybrid" fruits which could be harmful if swallowed. These undesirable mixtures of fact and supposition need to be eradicated before they become institutionalized. An authoritative source for information such as numbers of helicopters deployed but, unfortunately, not for the characteristics of helicopters, "The Military Balance 1979/80" (p. 100 or as reprinted in ***Air Force,*** December 1979, p. 135) published a table which listed a "4-barrel 23 mm cannon" among the armaments of the HIND-D. This has given rise to a new generation of erroneous information which has been spread by Captain McNamara in ***Military Intelligence*** (July-September 1980, p. 23) and as reprinted in ***Aviation Digest*** (January 1981, p. 47), although he also manages to include on the same page the correct assessment: "Latest reports indicate that it may have a radar-directed four-barrel 12.7 mm Gatling-type machinegun," citing CACDA HB 550-2 as his source.

The ultimate distortion, however, may be found in the normally reliable ***Flight International*** (16 August 1980, p. 612), where the author states of the HIND-D: "The 12.7 mm gun of the HIND-A is replaced by a

chin turret carrying a 23 mm, four-barrel Gatling-type gun with a rate of fire of 3,200 rounds/minute, giving an air-to-air as well as an air-to-ground capability." The extra detail on the rate of fire tends to lend substance to the myth/error, and the ascribed application in an air-to-air role also seems to lend credibility in light of recent attention to the possible use of the HIND in such a role. However, Captain Daschke, in ***Aviation Digest*** (December 1979, p. 43-44) assesses the "12.7 mm Gatling gun" of the HIND-D as capable of being employed in both close air support and air-to-air interdiction roles.

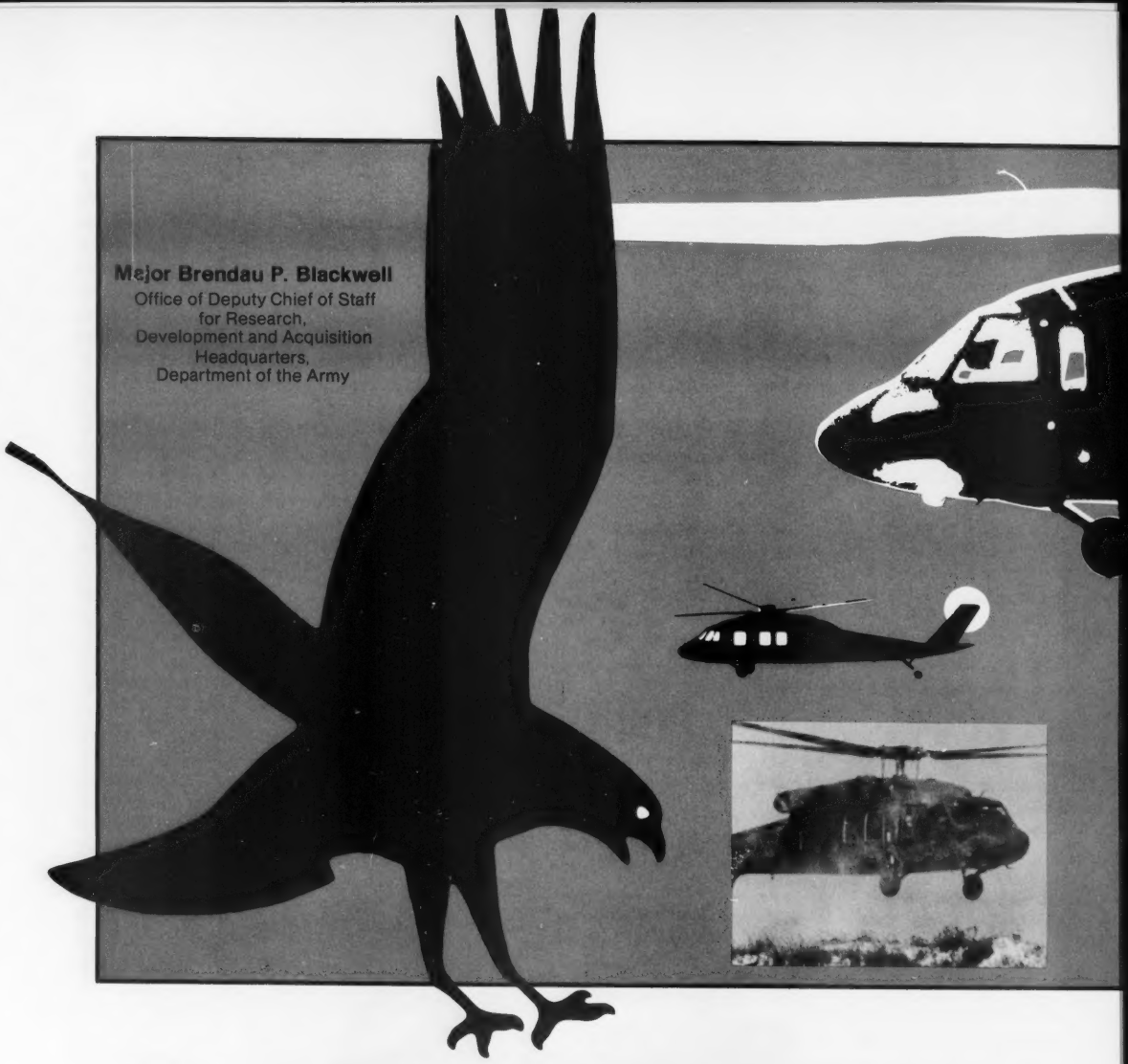
The picture is further muddied by the interjection of yet another variation on the theme in ***Jane's All the World's Aircraft 1979-80*** (p. 202): "Other developments reported in 1979 were the introduction of some 'HINDs' of a 30 mm Gatling-type nose gun and a laser seeker." The only other mention of such a weapon in connection with the HIND of which I am aware was in ***International Defense Review*** (No. 5/80, p. 682) where it is stated that the HIND-D is "likely to be supplemented soon in this close air support role by the new T-58 fixed wing aircraft. The latter seems to have been developed from the same concept as gave rise to the USAF A-10, being able to carry a heavy warload and mounting a 30 mm Gatling gun. HIND-D is heavily armed and is also armoured. Chin turret mounts a four-barrel Gatling gun . . . ." It is possible that a connection between the "30 mm Gatling gun" reported for the T-58 ground-support aircraft and the "four-barrel Gatling gun" (caliber unspecified) of the HIND-D has been made as the result of an error or perhaps as a conjecture that the armament of the fixed wing aircraft might also be used on the helicopter employed in the same role. The door to such an interpretation is left open by the author.

It remains to be seen whether the 30 mm Gatling gun is any more of a reality than the unconfirmed reports of a 23 mm gun.

HIND-D attack helicopter of the Czechoslovakian Air Force

photograph courtesy of *Air Force* magazine

Major Brendau P. Blackwell
Office of Deputy Chief of Staff
for Research,
Development and Acquisition
Headquarters,
Department of the Army

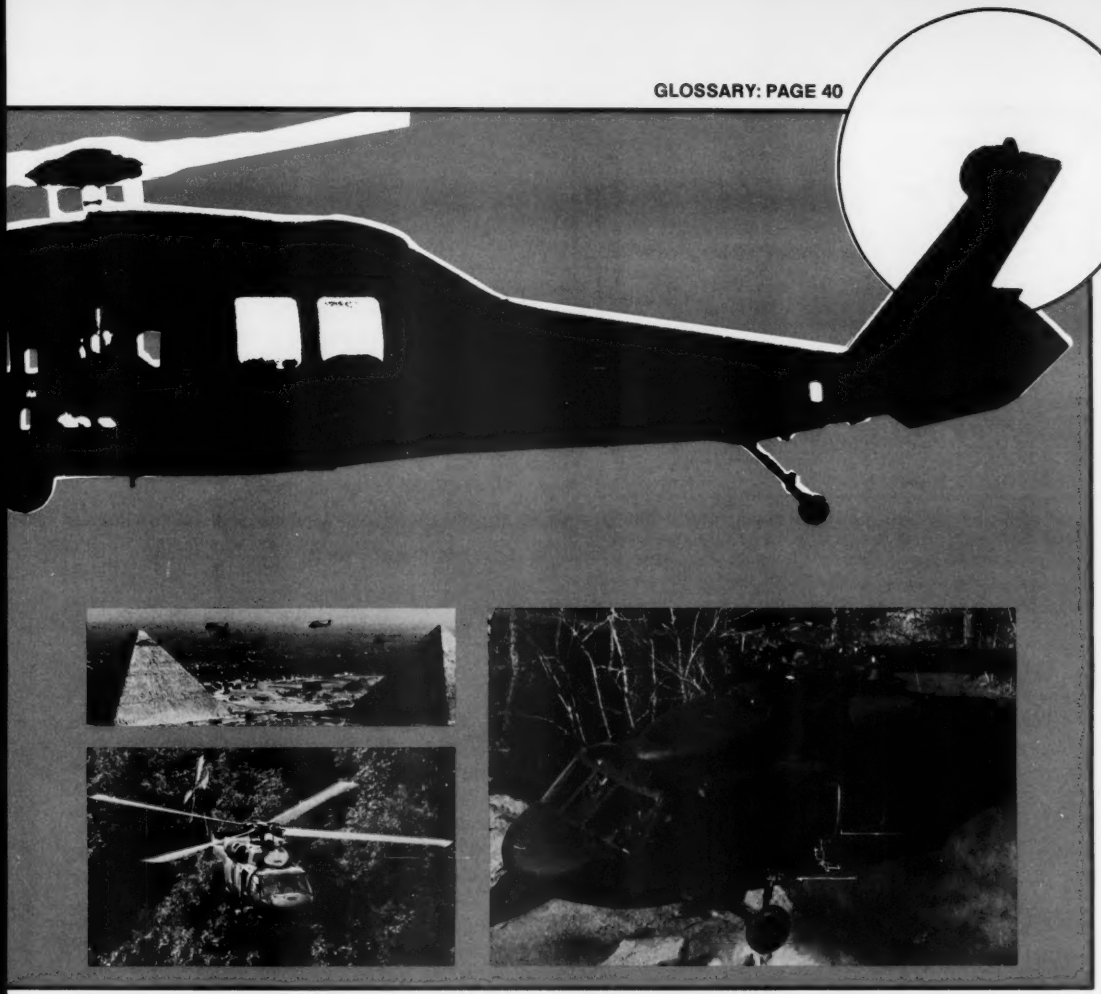


BLACK HAWK AROUND THE WORLD

PART I: A PROPOSAL

The U.S. Army was the first to fly a helicopter nonstop coast to coast when an H-21 named Amblin' Annie accomplished the feat in August 1956 (see October 1956 *Aviation Digest*). Now there is a golden opportunity for the U.S. Army to be the first to fly a helicopter around the world.

GLOSSARY: PAGE 40



NO HELICOPTER has ever circumnavigated the globe. But helicopter technology has advanced to the point where it is possible for any of several production models to accomplish the first flight around the world. The challenge exists and the U.S. Army should pursue this world aviation milestone. It is a certainty that another service or another nation will rise to the occasion and capture this one of a few remaining world aviation firsts yet to be accomplished.

The Rapid Deployment Force is being structured and tested. Self-deployment of helicopters must be fully explored in view of the shortage of strategic lift resources. This is the time to fly the UH-60 Black Hawk around the world and make history. This article, in support of deployment initiatives, presents a plan for using two UH-60A Black Hawk helicopters and two C-12 Huron fixed wing airplanes in support.

The U.S. Army needs to show that it can be done as part of a self-deployment exercise with a minimum of fanfare. It would be a bold test of the ultimate self-deployment capability of the Black Hawk, the newest frontline Army helicopter with true ATW reliability at both an "acceptable" dollar cost and risk.

Why ATW? Why would anyone want to fly a helicopter around the world? It is bound to be somewhat risky, fatiguing, not very stimulating and most importantly, it *would cost money!* An analyst might suggest that from a cost benefit/effectiveness point of view, "it only costs." But, there are potential payoffs both monetarily and in terms of public and world interest.

The Army has undertaken world record performance demonstrations in the past when an acceptable probability of success existed. No record

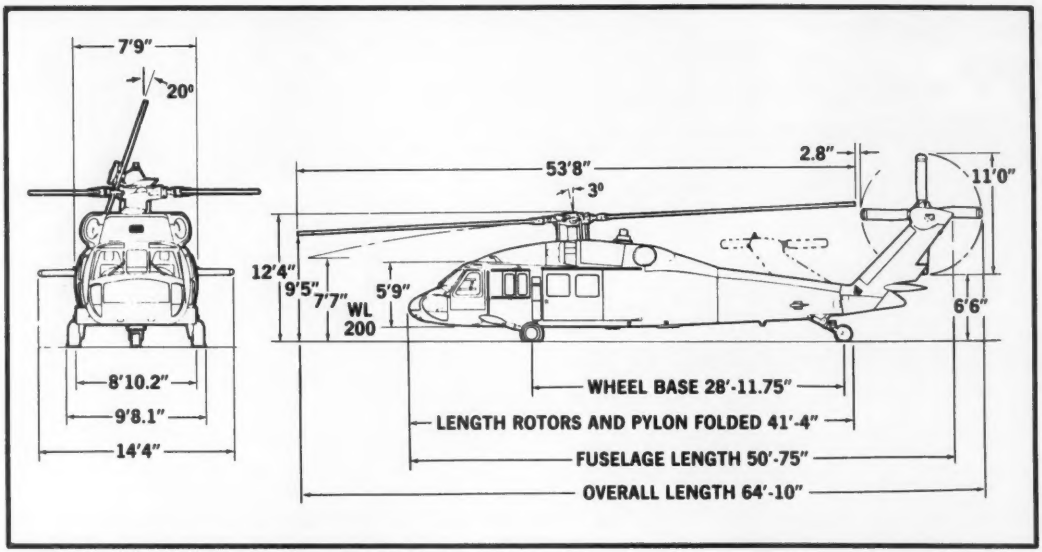


FIGURE 1: UH-60A principal dimensions

GLOSSARY

ADF	automatic direction finder
AFB	Air Force Base
ARS	air rescue squadron
ATW	around the world
DA	Department of the Army
DARCOM	Army Materiel Development and Readiness Command
DCSLOG	Deputy Chief of Staff for Logistics
DOCL	day of critical leg
Doppler	navigation radar system
FMS	foreign military sales
FORSCOM	Forces Command
IFR	instrument flight rules
INS	inertial navigation system
loran	long-range navigation system
mph	miles per hour
NATO	North Atlantic Treaty Organization
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NM	nautical miles
Omega	long-range navigation system
REFORGER	Return of Forces to Germany
TACAN	tactical air navigation
VOR	VHF omnidirectional range
VTOL	vertical takeoff and landing

now stands for a helicopter ATW demonstration. Whatever average speed is demonstrated would become the world record. This condition permits a "low pressure" program (no schedule pressure) and ensures maximum attention is paid to safety considerations. *Though the speed for an around the world flight may be exceeded on future ATW programs, no one can ever beat "first" once that first is achieved by the U.S. Army.*

The following are proffered as points of justification for completing the first rotary wing circumnavigation of the globe:

• There is a valid defense requirement for a self-deployment capability for weapons systems in support of the Rapid Deployment Force.

• A helicopter ATW flight would demonstrate a capability to build up aviation assets in theaters of operation. This is especially important in view of insufficient timely air/sealift. In a meaningful way it would show the U.S. Army's dedication to readiness and flexibility. Supports current policy of not prepositioning aviation assets for issue in selected theaters of operation.

• This feat has never been done. It can be done following a west to east route taking advantage of prevailing westerly winds.

• The U.S. Army would claim a history-making first.

• The Army's image would be enhanced by establishing the first world speed record for a helicopter ATW flight.

• Ultimate self-deployment capability of the UH-60A would be demonstrated with a public emphasis on peaceful applications. This is a logical extension of deployment exercises similar to Exercise Northern Leap in August 1979 (see August, September, October 1979 and March 1980 issues of *Aviation Digest*).

• ATW flight would demonstrate success of the U.S. Army UH-60A acquisition program and management of acquisition programs in general.

• ATW flight would dramatically demonstrate the dedication of the U.S. to force modernization, in support of the NATO alliance.

• Successful completion of the ATW program would enhance the morale of the Army and bolster its recruitment efforts in support of an all-volunteer force.

• The ATW flight would reinforce,

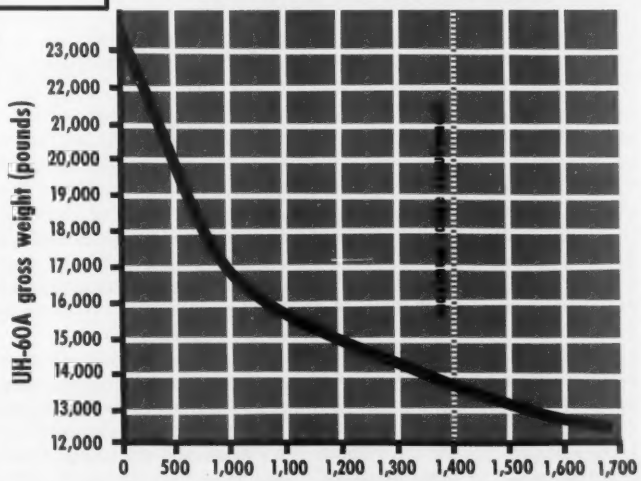
Performance and Weights	
Cruise speed	145+ kts
Max horizontal flight speed	165 kts
Never exceed speed	195 kts
Vertical rate of climb (4,000 ft. 95° 95% pwr)	450+ fpm
Endurance	2.3-3.0 hr
Range at max gross (int. fuel) (30 minute reserve)	300 NM
Range extended (w/extension kit) (30 minute reserve)	850+ NM
Normal mission gross weight	16,450 lb
Max gross weight (U.S. Army)	20,250 lb
GW hover OGE, sea level std. day (UH-60B)	21,844 lb
Propulsion	
Main—2 General Electric T700—GE-700 Turboshafts	1,543 shp ea
Auxiliary 1 Solar T 62-40	100 shp
Fuel tanks 2 self-sealing	157 gal ea
Main transmission rating	2,828 shp

FIGURE 2: UH-60A capabilities and specifications (selected)

			Pounds
Black Hawk weight empty (weight reduction for record)			10,624 (-1,050)
ATW empty weight			9,574
ATW Long Range equip/mods			2,000
Crew (2)			320
Misc fluids			103
Main Tank fuel	361.5 gallons	2,350	
Internal Aux fuel	762.0 gallons	4,953	
Added ATW Internal/ External Aus	607.5 gallons	3,950	
Total fuel	1,731.0 gallons		11,250
Gross weight			23,250

FIGURE 3: UH-60 weight breakout

FIGURE 4: range versus gross weight



in the eyes of the world, the leadership role of the United States of America and the U.S. Army in rotary wing technology.

- Reliability of helicopters and the emphasis placed by the U.S. Army on reliability and maintainability design would be demonstrated.
- The ATW program would stimulate pride in the citizens of the country in that this world aviation first was accomplished under the U.S. flag.
- U.S. Army policy, as stated in AR 95-28, states: "Department of Defense should conduct periodic official demonstrations of military aircraft for the purpose of establishing new performance records in the interest of keeping the U.S.A. and the world apprised of the U.S. engineering/technical capabilities."
- Foreign sales of U.S. rotary wing aircraft would be stimulated (primarily civilian versions, perhaps) and contribute to a favorable balance of trade. It is assumed that foreign military sales would be maintained within presidential FMS guidance.

Background. In 1924, two large Douglas World Cruisers, cloth covered aircraft, completed the first aerial circumnavigation of the globe representing the U.S. Army and the United States of America. Both the first powered aircraft—the Wright Flyer—and one of the World Cruisers—the Chicago—are enshrined in the Smithsonian Institute's Aerospace Museum. The airplane came into its own upon completion of the around-the-world flight and represented a remarkable triumph for both aircraft and aviators. Since, U.S. airplanes have set many world records currently recognized. As late as mid-1976, the U.S. Air Force recaptured several world records for speed and altitude from the MiG-25 Foxbat with the SR-71 Blackbird, and in 1980 beat its own record for a nonstop circumnavigation of the globe in a B-52 Stratofortress bomber in conjunction with a normal mission.

World 'class' records in Class E rotorplanes are permeated by achievements of the United States. Many

of the records were sponsored by the U.S. Army. For example, between 12 March and 7 April 1966, 23 world helicopter records were established using the YOH-6A Cayuse. Many of these records remain as the achievements to beat today.

In October 1971, U.S. Army pilots flew the CH-54B Flying Crane in successful record attempts for payload to altitude and time to climb records. Several of these were returned to the United States having been held previously by Russian helicopters. In April 1972, further world records were established by the U.S. Army in the CH-54B, again both in payload and time to climb. The door then closed on Army record programs!

Helicopters have come a long way in the 20th century, both because of the military application/advantages of a vertical takeoff and landing flying machine and because of the utility of the VTOL system in the civilian sector of the countries of the world.

The U.S. Army now operates about 9,000 helicopters and leads the world both in its commitment to rotary wing aviation and the number of helicopters it flies. With the development of the UH-60A the U.S. Army is fielding the most advanced utility tactical transport aviation system helicopter yet developed. It is appropriate that the U.S. Army continue in the world record arena and demonstrate the ultimate capabilities of the new "frontline" Black Hawk and its around-the-world reliability.

Candidate System. Figure 1 shows a simplified two view drawing of the UH-60, and a few key performance capabilities are listed in figure 2. These are intended to show the general size/configuration and capabilities of the aircraft in order to form a baseline from which ATW aircraft performance can be related. The UH-60A is now coming off the production line and is deployed within operational units of the 101st Airborne Division (Air Assault) and 82d Airborne Division.

Performance. A key question to consider when planning a history-making flight is, "Does the aircraft have the performance capability to accomplish the flight?" For the ATW flight, several routes were initially examined around which performance and risk could be assessed. The route around which this plan is formed is detailed a little later. For the purposes of addressing feasibility, the worst case (for range) was selected, that being one in which the aircraft would land for refueling and servicing on land versus a prepositioned aircraft carrier or another support vessel. It was determined that the critical leg would be from the northern island of Japan, Hokaido, to Shemya Air Force Base in the Aleutian Island chain. The Defense Mapping Agency computed the great circle distance to be 1,362 nautical miles from the city of Abashiri, Japan to Shemya AFB. Recognizing that the islands just north of Hokaido are administered by the Soviet Union, indirect routing reasonably required a minimum range capability of 1,400 NM using the city of Nemuro, Japan as the departing point.

No attempt will be made to define precisely the configuration of the ATW/UH-60A, but the *feasibility* of the aircraft accomplishing the ATW mission is addressed. Weight can be scrubbed from the UH-60A with a detailed effort and for the purposes of this article an ATW empty weight of 9,600 pounds is achievable.

Now it is necessary to add back to the ATW empty weight the necessary items which are required to fly around the world, as shown in figure 3, to achieve an operating weight of 12,000 lbs. Concerning the long-range navigation system, more will be said in a later section.

A variety of long-range extension tank configurations have been evaluated and a hybrid combination of internal/external systems will permit achieving the range capability necessary to fly the critical leg. Figure 4 shows an approximate range/gross weight curve that is achievable using a gross weight of 23,250 pounds. This gross weight is well within the performance capabilities of the UH-60. The near ultimate range capability is about 1,700 NM given zero winds and standard ambient conditions.

The aircraft can tolerate about a 13-knot headwind before breaking a 10-percent reserve limit and in excess of a 17-knot headwind before breaking a 45-minute reserve. These represent acceptable reserve margins.

Route. There are many routes over which a helicopter could fly around the world. The world situation is constantly changing, occasionally making it difficult or impossible for a U.S. aircraft to fly across or receive support from a particular nation. At other times, friendly relations are restored with countries resulting in renewed favorable situations. Without trying to outguess future events, a "conceptual" route is examined here to show that a route exists which can accommodate the ATW UH-60A performance capabilities; and fix a baseline from which a program plan can be developed, risk assessed, cost determined and weather in critical areas can be examined.

Though it is understood that on any particular day work-around routes may have to be developed, the ATW UH-60A has a range capability which provides some flexibility for the planner. Figure 5 portrays a west to east ATW route taking advantage of prevailing westerly winds. This route is about 21, 140 NM, with the majority of intermediate stops being U.S. military bases, major international airports or established ferry flight stopover points. It also makes maximum use of current low altitude air routes to simplify planning. The distance

listed exceeds the distance around the earth at the Tropic of Cancer or Capricorn (19,816.006 NM) which is the minimum distance one must fly around the world in order for the flight to qualify as an aerial circumnavigation of the globe. All official distance for the world record will be computed as great circle distances between landing points. For the outlined flight, this is estimated to be about 20,500 NM, making no allowances for indirect routing.

Figure 6 is a matrix of information pertaining to each of the 31 legs of the route. Column 2 shows the flight route segment distance and is used for the purposes of both schedule and fuel requirements for both the ATW UH-60A and C-12 support aircraft. Column 3 shows the critical overwater distance for that leg. Column 4 shows the UH-60A flight time for the given leg at best range speed and column 5 shows the appropriate C-12 flight time for that leg.

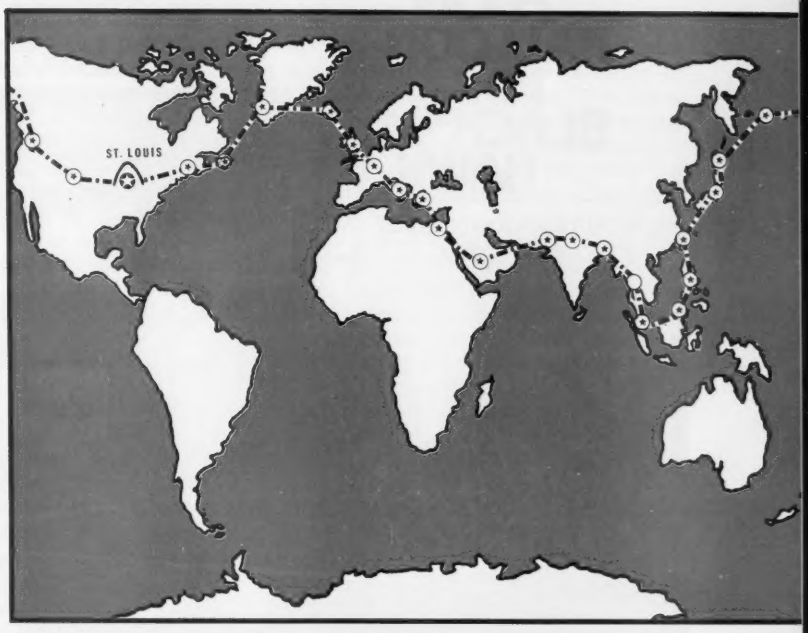


FIGURE 5: Around-The-World Route

Next month—Part II: The Starting Line

FIGURE 6: Route/distance/time

Stopover	Distance	Overwater	Flight Time UH-60	Flight Time C-12
St. Louis, U.S.A.				
Loring, U.S.A.	1,150	—	8.90	5.50
Goose Bay, Canada	500	120	4.00	2.80
Sondrestromfjord, Greenland	900	590	7.00	4.50
Keflavik, Iceland	780	420	6.00	3.90
Alconbury, England	1,000	600	7.70	5.00
Ramstein, Germany	350	75	2.70	2.00
Amenploa, Italy	610	—	4.70	3.20
Athens, Greece	420	200	3.30	2.30
Cairo, Egypt	635	480	4.90	3.40
Riyadh, Saudi Arabia	980	220	7.60	4.90
Dubia/Sharja	435	100	3.40	2.30
Karachi, Pakistan	725	425	5.60	3.60
New Delhi, India	575	—	4.50	2.90
Dacca, Bangladesh	800	—	6.20	4.20
Bangkok, Thailand	850	600	6.60	4.30
Singapore	840	400	6.60	4.30
Brunei (UK)	720	700	5.00	3.80
Clark AFB, Philippines	780	750	6.00	3.90
Clark AFB, Philippines				
Naha, Okinawa	780	750	6.00	3.90
Yokota AB, Japan	870	650	6.70	4.40
Misawa AB, Japan	320	—	2.50	1.80
Nemuro, Japan*	280	120	2.20	1.60
Shemya AFB, U.S.A.	1,400	1,400	10.80	6.70
NS Adak, U.S.A.	400	360	3.10	2.20
NS Kodiak, U.S.A.	950	900	7.40	4.80
Jueneau, U.S.A.	635	280	4.90	3.20
McChord AFB, U.S.A.	800	200	6.20	4.00
Mountain Home AFB, U.S.A.	350	—	2.70	2.00
Hill AFB, U.S.A.	250	—	2.00	1.40
Stapleton, U.S.A.	350	—	2.70	2.00
St. Louis, U.S.A.	700	—	5.40	4.00
*critical leg	21,140	10,340	163.30	108.80

49% overwater
0% @ > OEI GW

FROM BALLOON TO BLACK HAWK

The Army Forward Aeromedical Evacuation Story

Lieutenant Colonel David M. Lam, M.D.
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PART II: WORLD WAR II

EVEN WITHOUT full support of the Surgeon General, planning for forward air evacuation had commenced in the months prior to the United States' entry into World War II. In September 1940, organizational tables and plans were drawn up for an airplane ambulance shuttle squadron, which was conceived as having 18 single engine ambulance planes. Unfortunately, it was soon reported that no single engine plane in the inventory was suitable for air ambulance work. The Air Corps Plans Division recommended against the purchase of special planes, which would cause maintenance and supply difficulties, and recommended the conversion of obsolete aircraft of currently existing types for this mission. As had been seen during World War I, with the growing number of pilots undergoing flight training, there was an immediate need for crash-rescue aircraft at the various training centers, and the Air Corps Materiel Division obtained permission to convert three Stinson 0-49 liaison planes into an ambulance configuration, as soon as these planes entered the inventory in May 1941.

For more than a year, the 0-49B (later redesignated L-1B Vigilant) crash-rescue aircraft were the only forward air ambulances in the inventory. Although repeated redrawing of the organization plans for air ambulance battalions and groups all included at least one squadron of light plane ambulances, apparently this use of liaison aircraft had never been cleared with higher Army echelons. In October 1942, when the Air Surgeon requested the conversion of 20 liaison aircraft to a light air ambulance configuration, his request was rejected by the Department of the Army. Thus, nearly a year after American entry into the war, forward air evacuation was still nothing more than a dream. Unlike the massive organization which later evolved for long-range evacuation (using C-47 and other large aircraft) there was to be no Armywide develop-

ment of forward air evacuation in World War II.

On 6 June 1942, the War Department finally supported the struggle of the Field Artillery for assigned light aircraft to be used for the adjustment and observation of artillery fire (see "The Army Aviation Story," July 1962 *Aviation Digest*). Soon, Army ground force commanders began to recognize the numerous benefits of light aviation in carrying out the field mission. These tasks were varied: flying commanders, carrying emergency supplies and observation. Some enterprising pilots tied bazookas on the wing struts of their L-4 Cubs, and in fact were credited with destroying German tanks. Before the end of the war, organic aviation was owned by nearly all branches of the Army, which was operating more than 1,000 light liaison aircraft. Given the American talent for improvisation in the face of need, it would have been surprising if these aircraft had never been used for medical evacuation.

In fact, even though there was no organized forward air evacuation program, such use of liaison aircraft became relatively common, particularly in the Asian theater. Although light plane evacuation was attempted at Anzio, it was unsuccessful due to fierce enemy fire which prevented the unarmed and unarmored aircraft from landing. In Panama and the Caribbean area, this form of patient transport was used sporadically, although since there was no active combat in these areas, larger aircraft were often used when light planes would have been feasible. The U.S. Navy made extensive use of the L-4s converted to ambulances for crash rescue in the continental United States. It was in the Pacific area, however, where air superiority usually remained with the Allies, that light plane evacuation was used most extensively.

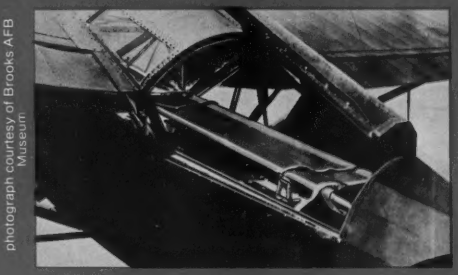
In the spring of 1943, glider training programs in the United States were decreased in number, and an assortment of Stinson L-1s and L-1As which had been used as tow aircraft was released for other purposes. In response to a request from The Surgeon, Thirteenth Air Force, made in April, permission was granted by the Army Air Forces to convert these surplus planes to an ambulance version, designated the L-1C (figure 1). In 1943, these planes were used in the Pacific sporadically and demonstrated their worth, but since the type was no longer in production, it was felt desirable to include a requirement for air ambulance capabilities in all future production liaison aircraft. Accordingly, all L-5 Sentinels produced after May 1944 were of the L-5B, or ambulance, version (figures 2 and 3).

In 1943, British Major General Orde C. Wingate had requested that he be furnished a squadron of light aircraft specifically for the purpose of evacuating his troops wounded during long-range penetration patrols in Burma. On previous missions, he had been forced to leave injured and sick men behind enemy lines, and he saw the light airplane as an ideal means of avoiding that situation in the future. After the normal delays and changes inherent in any military undertaking, General Wingate received his air ambulances. They were 103 L-1s and L-5s assigned to the U.S. First Air Commando Group, which was dedicated to supporting General Wingate during the invasion of North Burma in 1944. The unit flew its first combat missions on 3 February 1944, and on 5 February, the light planes began to earn their keep. Between 5 February and 6 March, more than 700 wounded were carried out of the front lines.

Not all forward air evacuation in the theater was carried out by planes of the First Air Commando Group. The Northern Area Combat Command was supported in North Burma by pilots of the 5th, 71st and 115th Liaison Squadrons, which evacuated in excess of 2,000 casualties. The North Burma Campaign, October and November 1944, became perhaps the greatest example of dedicated forward air evacuation in combat in the theater. "Evacuation of the wounded by air was greatly appreciated by the Soldier and was carried to a point that made it a distinguishing feature of the North Burma Campaign . . . without known exception every wounded Soldier, Chinese or American, evacuated out of the forward area, was transported by aircraft during part of his journey." Other liaison aircraft were assigned directly to the Chinese Army forces in Kwangsi and served in an air evacuation role.

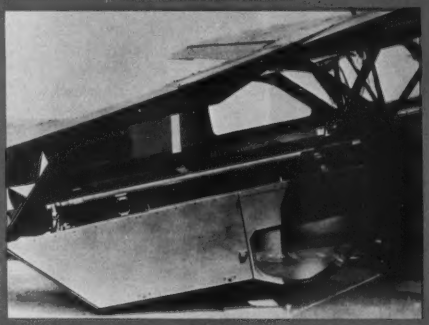
During 1943, a few liaison planes were present in the Philippine area and were used intermittently for interisland evacuation. These planes were unmodified types which had to be modified to ambulance configuration in the theater. In December 1944, the Third Commando Group, consisting of several squadrons of varying types of aircraft, arrived in the theater, only to find that there were no missions for them. The Surgeon of the Far Eastern Air Force, realizing that the liaison squadrons of this group were equipped with the new L-5B aircraft, recommended their use in an organized evacuation system. These units were offered to the Sixth Army, were accepted and eventually expanded to three squadrons and redesignated the Fifth Air Liaison Group. The squadrons were placed under the operational control of the 135th Medical Group, which controlled their use. The liaison group began air evacuation missions on 9 February 1945, and throughout the Luzon Campaign demonstrated the versatility and efficiency of forward air evacuation. The 25th Liaison Squadron joined in supporting the Philippine Campaign, and during the next 5 months, more than 19,000 patients were evacuated by this means.

Although the efforts made in forward evacuation by the pilots



photograph courtesy of Brooks AFB Museum

FIGURE 1:
L-1C aircraft with litter



photograph courtesy of Brooks AFB Museum

FIGURE 2:
L-5B ambulance conversion, World War II

photograph courtesy of Armed Forces Institute of Pathology

FIGURE 3:
L-5B ambulance in Korea

of the L-1s and L-5s were impressive, it rapidly became apparent that their aircraft had several distinct disadvantages. The most important of these was that landing and taking off with a patient load still required a minimally improved runway, whether airfield, river bar or road. It was only rarely that a liaison plane could land in a rice paddy or totally unprepared field, to say nothing of a small jungle clearing, and landing on ships was out of the question, except for a few aircraft carriers. The solution to these problems didn't appear until late in the war, too late to play a significant role in medical evacuation, but early enough to demonstrate the future utility of the light helicopter.

Although the autogiro had proved to be a disappointing failure, the Army's interest in rotary wing aircraft was rekindled in 1939 when Igor Sikorsky produced a successful helicopter. The Army subsequently contracted for several Sikorsky XR-4 helicopters (figure 4) for multiple use roles, and delivery began in 1942. The Air Surgeon realized that the helicopter offered numerous advantages over light planes for air evacuation, and requested that a helicopter be developed which could carry three to five litter patients. However, the YR-4A models to be delivered in 1943 could carry only one patient inside the fuselage, and larger models were not to be delivered until 1944. It was agreed, though, that future production of helicopters would include the capability of carrying at least two casualties in external pods. A development program for litter pods was undertaken; in November 1943, the first litter-bearing helicopter was flown, and late in the month was given field trials of its evacuation capability under arctic conditions in Alaska. It is interesting that the medical evacuation helicopter was tested under arctic conditions, since its first combat evacuation took place under much different conditions.

The First Air Commando Group in India, supporting General Wingate's Raiders, included among its aircraft three YR-4 helicopters, which apparently were added to its inventory at the intervention of Presidential Advisor Harry Hopkins at the last minute before the unit left the United States. The first of the YR-4s to be assembled in the China-Burma-India Theater crashed on its maiden flight on 21 March 1944, and it was not until early April that the other two became operational. On 23 April, one of the YR-4s was sent deep into Burma to rescue the pilot and three passengers of a light fixed wing evacuation plane which had crashed into deep jungle. Two of the passengers suffered from gunshot wounds and

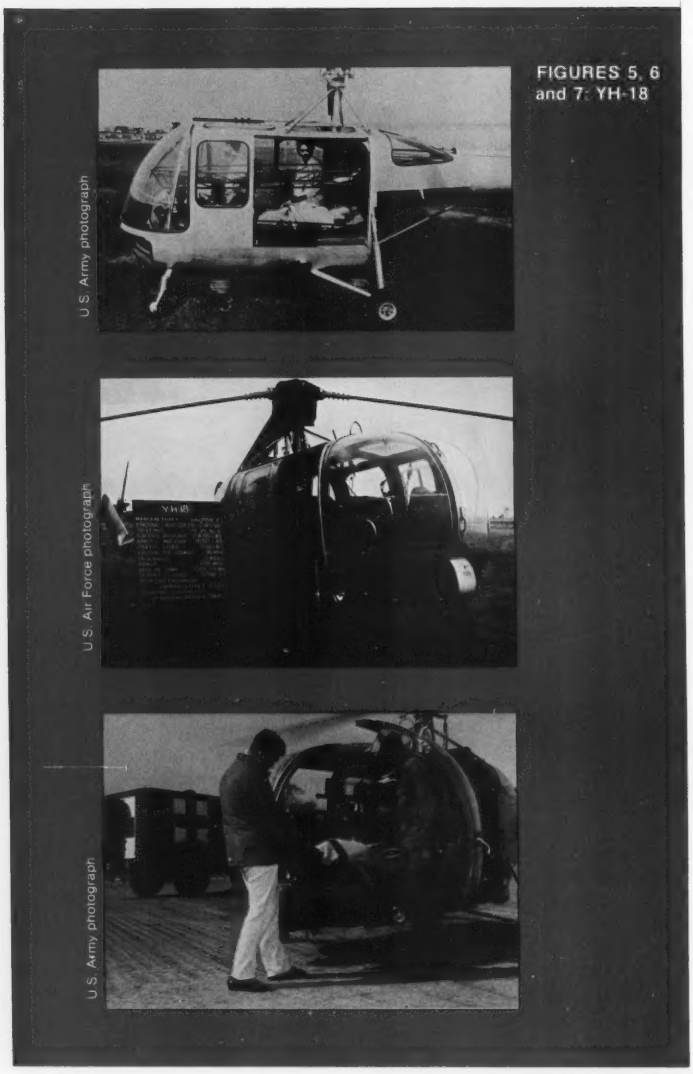
one had malaria. With numerous difficulties caused by engine overheating, which eventually caused the helicopter to become inoperable, all four men were rescued by the helicopter during the next 2 days, thus becoming the first of many who were to owe their lives to helicopter combat pickups. These early YR-4s had two major problems which were to plague them throughout their short time in the theater—a tendency to overheat and limited lifting capability. In spite of these problems, the helicopters of the First Air Commando Group saved 18 lives and clearly demonstrated that helicopter evacuation under combat conditions was feasible. Colonel Philip D. Cochran, commander of the group, reported, "We want people to know that it's not just a stunt. It really works. Just imagine what we could do with a couple hundred of them."

FIGURE 4: R-4 helicopter

As the helicopter began to be delivered to field units in larger quantities, there were more opportunities for rescue missions. On 4 April 1945, a YR-4 helicopter of the Tenth Air Force Air-Jungle Rescue Detachment rescued the survivor of a plane crash deep in enemy controlled Burma. Improved aircraft also were used in the evacuation role, including Sikorsky R-6 helicopters assigned to the 8th Emergency Rescue Squadron in China, which in 1945, during their first 6 months of operations, rescued 43 downed airmen. In June 1945, two infantry companies were isolated in the mountains of Luzon, the Philippines, and were unable to evacuate their wounded by any conventional means, so helicopters of the Fifth Air Service Area Command evacuated 50 seriously wounded or ill patients during an 8-day period. The effectiveness of these missions was recognized in the assignment of eight helicopters to each L-5 liaison squadron. A complete system of air evacuation of frontline troops based on the employment of L-5s and helicopters was drawn up for use in the invasion of Japan, but thankfully was not needed.

Confucious said, "If you would divine the future, study the past." Unfortunately, this maxim was lost sight of during the interwar years (1945 to 1950). Although the vast contributions of intertheater evacuation by air were recognized, and the Air Force continued the development of this form of transportation of the wounded, forward air evacuation was allowed to languish. Neither the Army nor the Air Force was inclined or able to devote much thought to the development of a forward air evacuation system. The impetus of combat was lacking, most evacuation could be carried out by larger transport aircraft and funding was extremely limited. Although they were remembered, the instances of massive forward air evacuation were still regarded by many as uncommon heroics rather than as practical signposts to the future. Dr. Richard Meiling, chairman of the Armed Forces Medical Policy Council, was to state in 1950 that, "As a peacetime operation, the air transportation of patients is steadily improving in efficiency. As a military operation under combat conditions, a lot of improvement is still required. There still . . . is the small minority which is unable or unwilling to recognize the inherent soundness of air evacuation."

In the demobilization which followed the end of World War II, the vast majority of Army liaison pilots and aircraft were released from the service, so that by the end of 1945, the Army had been reduced to about 200 liaison aircraft. Following the passage of the National Security Act of 1947 (Key West Agreements), which established the Air Force as a separate branch, many of those who had experience with air evacuation left the Army to join the new service. This further weakened the Army's commitment to forward air evacuation. The situation was further complicated by the interservice arguments that raged from 1947 to 1951 regarding whether forward air evacuation should be an Army or an Air Force responsibility. While the Air Force



FIGURES 5, 6 and 7: YH-18

U.S. Army photograph

U.S. Air Force photograph

U.S. Army photograph

naturally felt that it should control nearly all of the air power, the Army drew on its experiences with organic light aircraft in World War II to argue that only with certain organic aircraft could it continue to carry on its mission.

Joint Army and Air Force Adjustment Regulation 5-1-01 was issued on 20 May 1949 to try to resolve this issue, and limited the Army to fixed wing aircraft weighing less than 2,500 pounds and rotary wing aircraft weighing less than 4,000 pounds. The Army used this agreement to start rebuilding its air arm, at first with active opposition from the Air Force, and then with lessening opposition, probably occasioned primarily by the Air Force's major interest, the maintenance of a strategic striking force, along with budget limitations. Although a Department of Defense memorandum of 7 September 1949 stated clearly that, "responsibility for the air evacuation of patients continues to be vested in the Department of the Air Force . . .," the Air Force totally neglected the development of forward air evacuation, with the exception of the fielding of several air rescue squadrons, which had as their mission not combat pickup of casualties, but rescue of downed aircrewmen.

By 1949 the old YR-4 helicopters of World War II had been far surpassed by their successors. It appeared to the Army that the faults discovered in Burma and the Philippines had for the most part been overcome, and it was desired to commence testing of the newer helicopters specifically in the air evacuation role. Accordingly, in the summer of 1949, Army Field Forces Board No. 1 was established at Ft. Bragg, NC, to evaluate the helicopter as a medical evacuation vehicle. Using a Sikorsky YH-18 (figures 5, 6 and 7), capable of transporting two internal litters and a medical attendant, the board concluded that helicopter evacuation was both practical and desirable, and made numerous recommendations regarding its use. Unfortunately, the interservice debate prevented the development of either a medical helicopter or an organized system for using it.

Thus, when the North Korean People's Army invaded South Korea on 25 June 1950, the United States had no more of a forward evacuation capability than it had had 10 years previously. It was to prove some time before an orderly system of forward evacuation could be established, and as in World War II improvisation was the rule of the day.

Next Month: Part III: Korea. Anyone desiring Part I of this series (The Origins) can obtain it by writing: Editor, U.S. Army Aviation Digest, P.O. Drawer P, Ft. Rucker, AL 36362.

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WHAT'S SO SPECIAL about "Special VFR?" SVFR, where authorized, enables an aviator to request a clearance for visual flight rules (VFR) flight within a control zone during weather conditions of less than basic VFR minima. Thus, an aviator may have an option of other than instrument flight rules (IFR) handling in a terminal environment. Local SVFR operations may be defined by a Letter of Agreement between air traffic control (ATC) and the user specifying procedures such as a climb to VFR or specific routes into or out of the control zone.

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ANNUAL WRITING AWARDS

Your name could appear next July as a winner in the *Aviation Digest's* annual writing contest if your article is selected as a monthly winner from July through June. To be eligible for competition, an article must have no more than two authors, although multi-authored material is welcomed for publication. The three annual and the monthly winners receive Certificates of Achievement signed by the Commanding General, Army Aviation Center. In addition, the first-place annual winner is given a hand-held calculator and the author of each month's winning selection receives an engraved pen, courtesy the Army Aviation Center Thrift Shop. A panel of judges selects the monthly and annual winners based on accuracy, completeness, originality, readability, soundness, substance and overall merit. All published authors are provided an acknowledgment form to be placed in their personnel files. Manuscripts, to include necessary pictures, diagrams or charts, should be submitted to Editor, *U.S. Army Aviation Digest*, P.O. Drawer P, Ft. Rucker, AL 36362.

First Place **CW3 Russell D. Capps**

Second Place **Major James H. Kenton**

Third Place **Lt. Colonel (P) E.H. Grayson, Jr.**
Lt. Colonel J.W. Lloyd

July
So a Nice Girl Like You Wants to Drive a Huey
Captain Deborah K. Gilbert

August
One Flight
CW3 Michael F. Porter

September
Flight in the Twilight Zone
CW3 Russell D. Capps

October
"The Real Thing"
Ronald R. Simmons

November
The Aviation Commandery
Lieutenant Colonel (P) E.H. Grayson Jr.
Lieutenant Colonel J.W. Lloyd

December
Whatever Happened to the Spitfire
Major Robert W. P. Patterson

January
Cockpit Heat Stress in the AH-1G
Colonel J.R. Gauld, M.D., Lieutenant Colonel H.D. Silsby, M.D., Captain G. Ramirez

February
Experience
CW2 T. Cowart

March
Help Wanted?
David Hubble

April
Aviation Training in the 1980s - Another View
Major James H. Kenton

May
Tac Nukes & the Irrational Bear
Major Forrest. D. Williams

June
Operation Dragonfly
CW3 Sun B. Park